SUGARCANE RESEARCH

Annual Progress Report

1987

LOUISIANA
AGRICULTURAL
EXPERIMENT STATION
LOUISIANA STATE UNIVERSITY AGRICULTURAL CENTER

SUGARCANE RESEARCH

ANNUAL PROGRESS REPORT

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LOUISIANA AGRICULTURAL EXPERIMENT STATION
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FOREWORD

Research on sugarcane in the Louisiana Agricultural Experiment Station is an integral part of the LSU Agricultural Center's research-extension effort to provide the knowledge and technology base for efficient production and processing of sugarcane. Sugarcane research projects are lead by scientists in the Sugar Station, Audubon Sugar Institute, and the departments of: Agricultural Economics and Agribusiness, Agricultural Engineering, Agronomy, Entomology, and Plant Pathology and Crop Physiology.

Members of the Louisiana Agricultural Experiment Station maintain close working relations with colleagues in respective departments of the College of Agriculture and other colleges of the LSU Baton Rouge campus, the Louisiana Cooperative Extension Service, the Agricultural Research Service and Soil Conservation Service of the USDA, the American Sugar Cane League, and the Louisiana Department of Agriculture.

A major portion of the resources for production and processing research are linked to the St. Gabriel Research Station and Audubon Sugar Institute respectively. The Iberia Research Station and Citrus Research Station helped to accomplish specific sugarcane research objectives in 1987.

An important part of the 1987 research effort was conducted on cooperating farms and in cooperating factories throughout the industry. The dwindling of farm labor supply has been making the evaluation of location effects and location interaction effects increasingly difficult. However, these evaluations are very important and must be continued. The cooperation of individual sugarcane farms and sugarcane factories in conducting research projects and the financial support of the American Sugar Cane League is gratefully acknowledged.

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Cultural Practice and Soil Fertility Research with Sugarcane in Louisiana in 1987[1/]

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Research was continued in 1987 to determine the effects of cultural practices and fertilization on the yield of current varieties of sugarcane in Louisiana. Cultural practice experiments were conducted on methods and rates of planting, dates of planting, dates of harvest, cane stubble protection and stubble cane longevity. Soil fertility experiments were conducted on fertilizers and nematocide needs for succession cane, rates and methods of fertilizer application and rates of gypsum application. These experiments were conducted in cooperation with the St. Gabriel Research Station and growers in the cane area.

The research was designed to provide information in an effort to help cane growers to produce maximum economic yields and to increase profitability in sugarcane production. This annual progress report is presented to provide the latest available data on certain practices and not as a final recommendation for growers to use all of these practices. Recommendations are based on several years of research data.

The temperature during the winter months prior to the 1987 crop was mild and freeze damage to cane stubbles was minimum. A severe drought occurred in late summer and early fall causing a reduction in normal stalk yields and an increase in percent sucrose in the cane.

Methods of Planting

An experiment was conducted with plant cane to determine the effects of widths of planting furrow and rates of planting on the yield of cane varieties CP 72-370 and CP 76-331. The furrow widths were 15 and 24 inches and the rates of planting were 2 and 4 stalks in continuous lines on a standard row spacing. A V-furrow was planted with each variety as a check plot. The yield data obtained in this test are reported in Table 1.

The increases in yield of CP 72-370 were significant from the 15- and 24-inch drill with a four-stalk planting rate over the check plot. The increases in yield of CP 76-331 were significant from each drill width with each planting rate. The differences in yield between the drill widths with each rate and variety were small. The yield increase from the four- over the two-stalk rate was significant only from the 15-inch width with CP 72-370. The differences obtained in cane yield were principally due to differences in stalk population at harvest time. The drill width and planting rate did not affect the sugar content in each variety.

1/This research was supported in part by grant funds from the U.S. Gypsum Co., Allied Corporation, Freeport Sulphur Co. and by sugarcane growers.

Another experiment was continued in 1987 from a plant cane test in 1986 to determine the effects of widths of planting furrow and rates of planting on the yield of first stubble cane. The treatments were the same as in the plant cane described above. The first stubble data reported in Table 2 show that the increases in cane yield over the check plot were significant from the 15-inch drill width with CP 72-370 and from the 24-inch width with CP 76-331 using a four-stalk rate. The yield increase was significant from the 24- over the 15-inch width with CP 76-331 and the four-stalk rate. The four-stalk rate increased yield over the two-stalk rate only with CP 76-331 and the 24-inch drill width.

Date of Planting

An experiment was initiated to determine the effects of planting dates on the plant cane yield of four current varieties of sugarcane. The dates tested were September 2, October 6 and November 1 and the varieties were CP 70-321, CP 72-370, CP 74-383 and CP 76-331. The varieties were planted on each date in 1986 and harvested as plant cane in December, 1987. The data obtained are reported in Table 3. Varieties CP 70-321 and CP 74-383 produced significantly more cane yield when planted in September than October. CP 76-331 produced more yield when planted in September and October than in November. As an average of varieties, the yield was significantly higher from planting in September than the other months.

Another test was continued in 1987 from plant cane in 1986 to determine the effects of planting dates on the first stubble yield of four cane varieties. The dates were September 13, October 1, and November 11 and the varieties were CP 70-321, CP 72-370, CP 74-383 and CP 76-331. The varieties were planted on each date in 1985 and harvested as plant cane in 1986 and as first stubble in 1987. The yield data obtained with first stubble are reported in Table 4. The increase in cane yield was significantly higher from the November planting than the other dates only with variety CP 76-331. As an average of varieties, the differences in stubble cane yield among planting dates were small.

Succession Cane

An experiment was continued with second stubble cane in 1987 from succession planted sugarcane to determine the effects of applying fertilizers and Furadan nematocide in the fall and spring on cane yield. The test was planted with variety CP 70-321 in 1984 and conducted in plant cane in 1985, first stubble in 1986 and second stubble in 1987 on Commerce soil on the St. Gabriel Research Station. The treatments consisted of a fall application of 0-0-0 and 90-90-90 fertilizer at planting time and a spring application of 120-0-80 and 240-0-160 fertilizers in each crop year. Furadan at a rate of 10 lbs./A was applied at planting time and in the spring of each crop year.

The data obtained in 1987 are reported in Table 5. The application of fertilizer at planting time increased the second stubble cane yield only where Furadan was not applied. The differences in yield between the 120-0-80 and 240-0-160 treatments applied in the spring of 1987 were small. The increase in cane yield from the use of Furadan was significant only where the fall fertilizer was not applied.

An experiment was conducted with succession and fallow planted sugarcane to determine the effects of fertilizers, a nematocide and a fungicide on the yield of first stubble cane. The test was initiated with cane variety CP 70-321 on a Commerce silt loam soil located on the St. Gabriel Research Station in 1986. The treatments consisted of a fall application of 0-0-0 and 90-90-90 fertilizer with succession cane and a spring application of 120-0-80 and 240-0-160 fertilizers with fallow and succession planted cane. Furadan nematocide at 10 lbs./A was applied in the fall and spring and Ridomil fungicide at 1/2 pint/A was applied only in the spring. The fall applications were made at planting time in 1985 and the spring applications were made in April in 1986 and 1987.

The data obtained in first stubble cane are reported in Table 6. The increases in cane yield from the fall applied fertilizer were significant with the 120-0-80 applied in spring in succession cane. The differences in yield between the 120-0-80 and 240-0-160 fertilizer applied in the spring were small. The increase from Furadan was significant only in succession cane without the fall fertilizer applied. The use of Ridomil did not increase yield in this test. As an average, the succession cane produced slightly less yield without the fall fertilizer, but more yield with the fall fertilizer than the fallow planted cane. The application of a 90-90-90 fertilizer at planting time is important to maintain normal stubble yield from succession planted cane.

Rate and Method of Fertilizer Application

An experiment was initiated in 1987 to test rates and methods of fertilizer application on the yield of plant cane with variety CP 70-321. The extractable soil P was relatively high at this location and the fertilizer treatments consisted of 80 and 160 pounds of nitrogen and 0, 80 and 160 pounds of potash per acre. Two methods of application were tested consisting of banding the fertilizer in the off-bar furrow and broadcasting the fertilizer on the soil surface. All the treatments were applied in April, 1987. The data obtained are reported in Table 7. The cane yields produced with each treatment combination were significantly higher than the check plot. The yield increases from 80 and 160 lbs./A of N alone were significant, but the differences in yield between the two N rates were small. Yield increases from the 160-0-160 over the 160-0-80 were significant with the broadcast method. The band and broadcast methods of application produced similar cane yields.

Another test was continued in 1987 from plant cane in 1986 to test rates and methods of fertilizer application on the yield of first stubble cane with variety CP 74-383. The rates and methods tested were the same as described above in the plant cane test. The data obtained with first stubble cane are reported in Table 8. The cane yields produced with each treatment combination were significantly higher that the check plot yield, except the broadcast 160-0-0 fertilizer. The yield increases from the banded 80 and 160 lbs./A of N alone were significant, but the differences in yield between the N rates were small. Yield increases from the 160-0-80 and 160-0-160 over the 160-0-0 were significant with the broadcast method of application. The band and broadcast methods produced similar cane yields, except the broadcast produced less than the band method with 160-0-0 fertilizer.

An experiment was initiated in 1987 to test rates of fertilizer application on the yield of plant cane on an Iberia clay loam soil at the Iberia Research Station. The fertilizer treatments consisted of 80 and 160 lbs./A of N, 0 and 60 lbs./A of phosphate and 0, 80 and 160 lbs./A of potash in all possible combinations. Variety CP 70-321 was planted on the plots and the treatments were applied in April, 1987. The plant cane yield data are reported in Table 9. The yield increase from 160 over 80 lbs./A of N was small. The yield responses to phosphate and potash were significant with the 80-60-80, 80-60-160 and 160-60-160 treatments. The yield increase from 160 over 80 lbs./A of potash was significant with the application of 160 lbs./A of N and 60 lbs./A of phosphate.

Gypsum Tests

A test was continued with second stubble cane in 1987 to determine the effects of applied mined gypsum on soil properties and cane yield on a Sharkey clay soil at Judice Farms near New Iberia. The rates of gypsum tested were 0, 1, 2.5, 5 and 10 tons per acre with four replications of each rate. The treatments were broadcasted by hand and mixed into the topsoil with the use of a rototiller prior to planting variety CP 65-357 in the fall of 1984. Normal cultural and fertilization practices were followed during the growing seasons and the plant cane crop was harvested in 1985, the first stubble was harvested in 1986 and second stubble in 1987.

The yield data obtained with second stubble are reported in Table 10. The cane yields up to the 5-ton/A treatment were similar. The 10-ton/A rate produced significantly more cane yield than the other rates. The increase in yield was apparently due to increases in the stalk population and average stalk weight. The juice quality was not affected by the gypsum treatments.

Another test was continued with first stubble cane in 1987 to determine the effects of applied by-product gypsum on soil properties and cane yield on a Sharkey clay soil at Cinclare Plantation in West Baton Rouge Parish. The rates of by-product gypsum tested were 0, 1, 2, 5 and 10 tons per acre of Fluorogypsum and 5 tons per acre of phosphogypsum. The gypsum was broadcasted with a fertilizer spreader and mixed into the topsoil with the use of a rototiller prior to planting cane variety CP 72-356 in the fall of 1985. The plots were harvested as plant cane in 1986 and first stubble in 1987. The data obtained with first stubble are reported in Table 11. The yield increase over the check plot from the 1 ton rate approached significance and the increases from the other rates were significant. The yield increases from the 2-, 5- and 10-ton/A rates were similar and the increases from the 5- and 10-ton/A rates over the 1 ton rate were significant. The difference in yield between the two types of by-product gypsum was small. The increases were apparently due to increases in stalk population and average stalk weight. The juice quality was not affected by the gypsum treatments.

Date of Harvest

Experiments on date of harvesting current sugarcane varieties were conducted on the St. Gabriel Research Station. One test was initiated in 1986 to determine the effects of harvesting plant cane on the yield of the following first stubble crop in 1987. Plant cane varieties CP 65-357, CP 70-321, CP 72-370 and CP 74-383 was harvested on September 1, October 6,

November 11 and December 4 in 1986. The first stubble was harvested in November, 1987 and the yield data are reported in Table 12. Generally, the effects of date of harvesting plant cane on the yield of the following first stubble crop were similar with varieties CP 70-321, CP 72-370 and CP 74-383. The September and December harvest dates produced the highest yield and the November date produced the lowest yield. Variety CP 76-331 produced the highest yield from the December harvest, but it was the least affected by the harvest date. As an average of varieties, the September date produced significantly more yield and the November date produced significantly less yield than the other harvest dates. The December harvest date of plant cane had a tendency to increase the percent sucrose in first stubble cane of each variety.

Another test was initiated to determine the effects of date of harvesting plant cane on the yield of plant cane in 1987 and first stubble cane in 1988. Plant cane of varieties CP 70-321, CP 72-370, CP 74-383 and CP 76-331 was harvested on September 1, October 1, November 2 and December 1 in 1987. The data obtained for the last three harvest dates are reported in Table 13. The cane yield significantly increased during October with varieties CP 70-321, CP 72-370 and CP 76-331 and during November with varieties CP 74-383 and CP 76-331. As an average of varieties, the increases in cane yield, percent sucrose and sugar yield in October and increases in average stalk weight and sugar yield in November were significant.

Stubble Protection

An experiment was conducted on stubble protection from freeze damage to possibly increase the yield and longevity of stubble cane. The protection treatments consisted of covering the cane stubble with approximately three inches of soil after harvesting a crop and a check plot without covering. The soil cover was applied prior to the occurrence of a freeze and the cover was removed in the following spring with a stubble shaver.

Plant cane of varieties CP 65-357 and CP 72-370 was harvested on October 1, November 11 and December 9 in 1986 and the soil cover treatment was applied to the cane stubble of each variety immediately after each harvest date. The data obtained with first stubble in 1987 are reported in Table 14. The increases in cane yield due to the soil cover was significant with the December harvest date of each variety. The increase was larger with CP 72-370 (6.5 T/A) than CP 65-357 (3.1 T/A). The soil cover treatment did not affect the juice quality in the cane. CP 72-370 has been consistent over the years in responding more to the cover treatment than other varieties.

Stubble Cane Longevity

A stubble longevity test was initiated with plant cane in 1985 and continued with first stubble in 1986 and second stubble in 1987 to study the effects of cane varieties, Furadan nematocide and stubble protection on stubble crop yields. The varieties were CP 70-321, CP 72-370 and CP 74-383 and the Furadan rates used were 0 and 10 pounds per acre. The Furadan was applied at planting time in 1984 and in the off-bar furrow in April, 1985, 1986 and 1987. The stubble protection which consisted of covering the cane stubble with soil after harvesting the plant cane and first stubble crops was applied in December of each crop year. The data obtained for the second

stubble are reported in Table 15. The cover treatment significantly increased the cane yield of each variety with and without the use of Furadan. As an average of varieties and Furadan treatment, the cover treatment significantly increased the cane yield (4.2 T/A), stalk population and sugar yield. Furadan increased the cane yield with CP 72-370 and CP 74-383.

1987 Publications

Ricaud, R. and Arceneaux, A. 1987. Fertilization of sugarcane with high plant population. Jour. Am. Soc. of Sugarcane Tech., Vol. 7, pp. 69-74.

Ricaud, R. and Arceneaux, A. 1987. Fertilizer needs for succession planted sugarcane. Jour. Am. Soc. of Sugarcane Tech. (In press).

Ricaud, R. and Arceneaux, A. 1987. Fertilization of sugarcane with high plant population. Better Crops. (In press).

Buselli, E., Arceneaux, A. and Ricaud, R. 1987. Effects of applied gypsum on Alligator clay soils and sugarcane. Jour. Am. Soc. of Sugarcane Tech. (In press), Sugar Azucar, Vol. 82, No. 6, p. 23.

Ricaud, R. and Arceneaux, A. 1986. Cultural practices and soil fertility for sugarcane. Sugarcane Research, Progress Report, LAES, pp. 18-37.

Ricaud, R., A. Arceneaux and H. P. Viator. 1986. Sweet sorghum for biomass and sugar production in Louisiana. Sugarcane Research, Annual Progress Report, La. Agric. Exp. Sta., pp. 44-50.

Table 1. Effect of planting furrow width and rate of planting on plant cane yield of two varieties of sugarcane on a Commerce soil at the St. Gabriel Station, 1987.

Variety of cane	Drill width	Rate of planting	Plant cane yield	Stalk		Normal juice		Sugar yield
				No.	Wt.	Brix	Sucrose	
	in.	stalks	T/A	1000/A	lbs.	%	%	lbs/A
CP 72-370	V	2	37.4	27.0	2.84	16.9	13.8	7347
	15	2	38.1	29.7	2.83	17.3	14.2	7760
	15	4	42.3	33.0	2.61	17.3	13.9	8353
	24	2	39.5	28.3	2.92	17.3	14.1	7930
	24	4	41.5	30.7	2.84	17.2	14.1	8383
CP 76-331	V	2	40.5	26.5	3.38	17.9	15.0	8741
	15	2	44.4	29.4	3.21	17.6	14.6	9303
	15	4	45.9	35.3	3.11	17.8	14.8	9823
	24	2	44.4	28.1	3.43	17.6	14.5	9251
	24	4	46.8	32.1	2.93	18.0	15.1	10,186
LSD .05			2.7	3.7	0.26	0.5	0.5	680

Rate of planting was the number of stalks planted in continuous lines with a 10% overlap.

Table 2. Effect of planting furrow width and rate of planting on first stubble cane yield of two varieties of sugarcane on a Commerce soil at the St. Gabriel Station, 1987.

Variety of cane	Drill width	Rate of planting	Stubble cane yield	Stalk		Normal juice		Sugar yield
				No.	Wt.	Brix	Sucrose	
	in.	stalks	T/A	1000/A	lbs.	%	%	lbs/A
CP 72-370	V	2	32.3	29.4	2.39	17.8	14.5	6725
	15	2	34.7	28.5	2.41	18.0	14.8	7352
	15	4	35.9	33.4	2.28	17.4	14.1	7241
	24	2	32.1	31.5	2.49	17.8	14.7	6759
	24	4	34.9	30.1	2.17	17.8	14.2	7058
CP 76-331	V	2	36.3	31.2	2.68	18.8	15.5	8179
	15	2	36.1	27.8	2.71	19.9	16.7	8869
	15	4	34.9	29.1	2.59	19.7	16.4	8379
	24	2	34.8	29.6	2.34	19.5	16.3	8310
	24	4	40.0	29.1	2.59	19.1	15.9	9296
LSD .05			3.4	NS	0.40	0.7	0.6	719

Rate of planting was the number of stalks planted in continuous lines with a 10% overlap.

Table 3. Effect of date of planting on the plant cane yield of four varieties of sugarcane on Commerce soil on the St. Gabriel Station, 1987.

Variety of cane	Date of planting	Plant cane yield	Stalk		Normal juice		Sugar yield
			No.	Wt.	Brix	Sucrose	
		T/A	1000/A	lbs.	%	%	lbs./A
CP 70-321	Sept. 2	31.8	31.3	2.66	17.6	15.0	6903
	Oct. 6	27.5	26.6	2.82	17.0	14.2	5584
	Nov. 1	25.9	19.4	2.65	18.7	15.5	5817
CP 72-370	Sept. 2	32.8	29.2	2.38	18.0	15.1	7174
	Oct. 6	29.0	24.6	2.54	17.8	15.0	6281
	Nov. 1	33.4	24.1	2.77	17.7	14.9	7175
CP 74-383	Sept. 2	31.3	25.8	2.53	17.0	14.4	6477
	Oct. 6	27.4	22.3	2.55	17.2	14.6	5724
	Nov. 1	29.2	21.9	2.57	17.4	14.6	6132
CP 76-331	Sept. 2	36.4	30.0	2.72	18.7	15.9	8498
	Oct. 6	35.9	26.3	3.15	18.7	16.0	8348
	Nov. 1	32.6	24.4	3.65	18.1	15.4	7259
LSD .05		2.5	3.4	0.42	1.3	1.2	841
			Mean planting date effect				
	Sept. 2	33.1	29.1	2.57	17.3	15.1	7263
	Oct. 6	29.9	24.9	2.77	17.7	14.9	6484
	Nov. 1	30.3	22.5	2.91	18.0	15.1	6596
LSD .05		1.2	1.7	0.21	NS	NS	420

Table 4. Effect of date of planting on the first stubble yield of four varieties of sugarcane on a Commerce soil at the St. Gabriel Station, 1987.

Variety of cane	Date of planting	Stubble cane yield	Stalk		Normal juice		Sugar yield
			No.	Wt.	Brix	Sucrose	
		T/A	1000/A	lbs.	%	%	lbs./A
CP 70-321	Sept. 13	34.2	31.3	2.34	19.1	16.3	8149
	Oct. 1	34.3	34.9	2.43	19.3	16.5	8295
	Nov. 11	36.0	31.5	2.38	18.6	15.8	8281
CP 72-370	Sept. 13	31.3	31.2	2.16	17.9	14.8	6622
	Oct. 1	30.4	32.5	2.14	18.5	14.4	6545
	Nov. 11	29.7	28.5	2.31	18.0	14.6	6243
CP 74-383	Sept. 13	34.3	34.0	2.27	18.0	15.1	7460
	Oct. 1	32.8	33.5	2.35	18.3	15.1	7123
	Nov. 11	34.9	34.9	2.41	18.0	14.7	7384
CP 76-331	Sept. 13	34.9	36.4	2.60	19.1	15.8	8044
	Oct. 1	34.8	33.8	2.75	19.2	16.1	8166
	Nov. 11	37.7	34.1	2.60	19.0	15.9	8758
LSD .05		2.2	4.9	0.25	0.7	0.7	485
			Mean planting date effect				
	Sept. 13	33.6	33.2	2.34	18.5	15.5	7569
	Oct. 1	33.1	33.7	2.42	18.8	15.6	7532
	Nov. 11	34.6	32.2	2.43	18.4	15.3	7666
LSD .05		1.1	NS	NS	0.4	0.3	NS

Table 5. Effect of fall and spring applications of fertilizers and Furadan nematocide on the yield and yield components of second stubble cane from planting in succession without a fallow year on Commerce silt loam soil at the St. Gabriel Research Station, 1987.

Fertilizer $N-P_2O_5-K_2O$		Stubble cane	Stalk		Normal juice		Sugar
Fall	Spring	yield	No.	Wt.	Brix	Sucrose	yield
lbs./A	lbs./A	T/A	1000/A	lbs.	%	%	lbs./A
			Succession - No Furadan				
0-0-0	120-0-80	31.3	30.7	2.79	17.4	13.9	6195
	240-0-160	32.7	33.5	2.55	17.8	14.4	6742
90-90-90	120-0-80	34.9	32.1	2.66	18.0	14.3	7157
	240-0-160	35.8	31.2	2.79	17.7	14.2	7264
			Succession - 10 lbs./A Furadan				
0-0-0	120-0-80	34.8	31.0	2.56	17.4	13.9	6879
	240-0-160	35.8	32.6	2.64	17.6	13.9	7117
90-90-90	120-0-80	36.0	31.4	2.47	18.2	14.5	7511
	240-0-160	37.5	31.5	2.56	17.6	13.8	7375
LSD .05		2.5	NS	NS	0.6	NS	652

The succession cane was planted immediately following a harvested crop of second stubble cane in 1984. Cane variety CP 70-321 was planted in the test and the fall fertilizer and Furadan treatments were applied at planting time. The spring fertilizer and Furadan treatments were applied in April of 1985, 1986 and 1987. The cane was harvested in November of each crop year.

The extractable soil K, Ca, Mg and P were 117, 2036, 360 and 106 ppm, respectively, with a soil organic matter of 0.99% and pH 6.2.

Table 6. Effects of fall and spring applications of fertilizers, Furadan nematocide and Ridomil fungicide on the yield of first stubble from plant cane planted on fallow land and in succession with another crop on Commerce silt loam soil at the St. Gabriel Research Station, 1987.

Fertilizer $N-P_2O_5-K_2O$		Soil pesticide	Stubble cane	Stalk		Normal juice	Sugar
Fall	Spring	treatment	yield	No.	Wt.	sucrose	yield
--------lbs./A--------			T/A	1000/A	lbs.	%	lbs./A
			Fallow planted cane				
0-0-0	120-0-80	Check	33.6	31.5	2.61	15.6	7600
0-0-0	120-0-80	Ridomil	33.7	31.8	2.38	15.6	7658
0-0-0	120-0-80	Furadan	36.0	30.3	2.50	15.8	8291
0-0-0	240-0-160	Furadan	35.4	30.7	2.52	15.7	8052
			Succession planted cane				
0-0-0	120-0-80	Check	32.3	29.9	2.60	16.1	7570
0-0-0	120-0-80	Ridomil	31.1	29.0	2.44	15.5	6990
0-0-0	120-0-80	Furadan	35.0	30.1	2.59	15.8	8055
0-0-0	240-0-160	Furadan	36.4	28.3	2.63	15.6	8167
90-90-90	120-0-80	Check	36.2	32.2	2.73	15.4	8099
90-90-90	120-0-80	Ridomil	36.2	33.7	2.58	15.6	8164
90-90-90	120-0-80	Furadan	37.7	32.0	2.63	15.6	8514
90-90-90	240-0-160	Furadan	38.4	36.1	2.79	15.7	8794
LSD .05			2.6	3.1	0.29	0.6	645

The fallow cane was planted after a year without growing a crop and the succession cane was planted immediately after harvesting a cane crop in 1985. Cane variety CP 70-321 was planted in the test and the fall fertilizer and Furadan were applied at planting time. The spring fertilizer, Furadan and Ridomil were applied in April and the cane was harvested in November, 1986 and 1987.

Application rates were 10 lbs./A Furadan and ½ pint/A for Ridomill.

The extractable soil K, Ca, Mg and P were 62, 1566, 277 and 249 ppm, respectively, with soil organic matter of 1.47% and pH 6.8.

Table 7. Effect of rates and method of fertilizer application on the yield and yield components of plant cane on a Commerce silt loam soil at the St. Gabriel Station, 1987.

Fertilizer applied $N-P_2O_5-K_2O$	Method of application	Plant cane yield	Stalk		Normal juice		Sugar yield
			No.	Wt.	Brix	Sucrose	
lb./A		T/A	1000/A	lbs.	%	%	lbs./A
0-0-0	-	24.4	20.4	2.45	18.6	15.6	5525
80-0-0	Band	29.3	22.4	2.80	18.7	15.8	6705
80-0-80	Band	30.9	19.1	2.59	18.0	15.1	6724
80-0-80	BC	29.8	20.5	2.60	18.4	15.4	6647
160-0-0	Band	30.0	23.5	2.92	18.4	15.5	6737
160-0-0	BC	29.9	23.3	2.69	18.6	15.5	6728
160-0-80	Band	30.4	21.8	2.69	18.9	15.9	7032
160-0-80	BC	28.6	22.6	2.81	18.6	15.7	6522
160-0-160	Band	30.0	23.3	2.76	18.2	15.3	6635
160-0-160	BC	33.8	21.6	2.76	18.5	15.4	7546
LSD .05		4.3	NS	0.35	0.4	0.5	961

BC = Broadcast

The experiment was conducted with variety CP 65-357 and the cane was fertilized in April and harvested in December, 1987. The band application was made in the off-bar furrow and the broadcast application was made on the entire soil surface of the plot.

Table 8. Effect of rate and method of fertilizer application on the yield and yield components of first stubble cane on a Commerce silt loam soil at the St. Gabriel Station, 1987.

Fertilizer applied $N-P_2O_5-K_2O$	Method of application	Stubble cane yield	Stalk		Normal juice		Sugar yield
			No.	Wt.	Brix	Sucrose	
lb./A		T/A	1000/A	lbs.	%	%	lbs./A
0-0-0	-	26.7	24.2	2.21	17.3	14.2	5406
80-0-0	Band	33.6	30.2	2.55	17.0	13.8	6547
80-0-80	Band	32.4	28.2	2.46	17.1	13.9	6425
80-0-80	BC	30.8	29.8	2.53	17.3	14.3	6288
160-0-0	Band	33.4	32.6	2.67	16.8	13.2	6231
160-0-0	BC	29.6	29.6	2.27	17.3	14.1	5944
160-0-80	Band	32.7	29.3	2.49	17.2	13.7	6386
160-0-80	BC	34.0	30.2	2.30	17.1	13.7	6639
160-0-160	Band	33.1	31.3	2.62	17.1	13.9	6507
160-0-160	BC	32.9	27.4	2.28	17.7	14.5	6812
LSD .05		3.1	4.4	0.30	NS	1.1	762

BC = Broadcast

The experiment was conducted with variety CP 70-321 and the cane was fertilized in April and harvested in December, 1987. The band application was made in the off-bar furrow and the broadcast application was made on the entire soil surface of the plot.

The extractable soil K, Ca, Mg and P were 148, 1591, 368 and 311 ppm, respectively, with a soil organic matter of 0.94% and pH 7.1.

Table 9. Effect of rate of fertilizer application on the yield and yield components of plant cane on an Iberia clay loam soil at the Iberia Research Station, 1987.

Fertilizer applied $N-P_2O_5-K_2O$	Plant cane yield	Stalk		Normal juice		Sugar yield
		No.	Wt.	Brix	Sucrose	
lbs./A	T/A	1000/A	lbs.	%	%	lbs./A
80-0-0	42.8	27.7	3.09	17.7	14.8	9125
80-60-0	42.8	27.8	3.08	18.1	15.1	9360
80-0-80	42.4	26.9	3.16	18.0	15.2	9338
80-60-80	46.0	28.1	3.27	17.8	15.0	9990
80-0-160	42.4	27.6	3.07	17.5	14.6	8867
80-60-160	46.2	28.0	3.30	17.6	14.7	9763
160-0-0	43.2	26.6	3.25	18.1	15.1	9430
160-60-0	44.2	27.1	3.27	18.3	15.3	9832
160-0-80	42.8	27.5	3.12	17.7	14.6	8976
160-60-80	44.5	26.9	3.31	18.2	15.3	9871
160-0-160	42.2	27.9	3.02	18.0	15.0	9153
160-60-160	50.0	28.4	3.53	17.6	14.8	10,650
LSD .05	3.2	1.7	0.18	NS	NS	851

The experiment was conducted with variety CP 70-321 and the cane was fertilized in April and harvested in December, 1987.

The extractable soil K, Ca, Mg and P were 227, 2996, 698 and 181 ppm, respectively, with a soil organic matter of 1.52% and pH 6.0.

Table 10. Effect of rates of mined gypsum on the yield and yield components of second stubble cane on a Sharkey clay soil at Judice Farm in Iberia Parish, 1987.

Gypsum applied	Stubble cane yield	Stalk		Normal juice		Sugar yield
		No.	Wt.	Brix	Sucrose	
T/A	T/A	1000/A	lbs.	%	%	lbs./A
0	27.4	27.8	1.97	18.2	14.3	5608
1	28.6	27.5	2.07	18.4	14.3	5852
2.5	26.1	25.8	2.01	18.1	13.8	5098
5	27.1	26.2	2.07	18.2	14.0	5397
10	32.6	28.7	2.27	17.9	13.6	6289
LSD .05	3.6	2.0	0.16	NS	NS	874

The gypsum treatments were applied broadcasted and disked into the soil prior to planting in 1984.

Table 11. Effect of rates of by-product gypsum on yield and yield components of first stubble cane on a Sharkey clay soil at Cinclare Plantation in West Baton Rouge Parish, 1987.

By-product gypsum applied 1/	Stubble cane yield	Millable stalk			Normal juice		Sugar yield
		No.	Wt.	Length	Brix	Sucrose	
T/A	T/A	1000/A	lbs.	in.	%	%	lbs./A
0	16.8	18.5	1.81	70	17.4	13.4	3156
1	19.4	20.3	1.92	71	17.6	13.6	3747
2	22.1	21.5	2.06	76	17.1	13.2	4082
5	24.0	22.7	2.13	76	17.4	13.5	4566
5 P	24.4	22.3	2.19	74	17.1	13.3	4550
10	23.6	23.2	2.03	74	16.9	12.9	4263
LSD .05	3.0	2.4	0.20	5	NS	NS	594

1/Fluorogypsum was used for all treatments except phosphogypsum was used for the 5 P treatment for comparison purposes. The gypsum treatments were applied broadcasted and disked into the soil prior to planting in 1985.

Table 12. Effect of date of harvest plant cane on the yield of the subsequent stubble cane of four varieties on Commerce soil on the St. Gabriel Research Station, 1987.

Variety of cane	Date of plant cane harvest	Stubble cane yield	Stalk		Normal juice		Sugar yield
			No.	Wt.	Brix	Sucrose	
	1986	T/A	1000/A	lbs.	%	%	lbs./A
CP 70-321	Sept. 1	31.5	35.7	2.29	18.3	15.5	7093
	Oct. 6	28.8	32.7	2.34	18.3	15.5	6474
	Nov. 11	26.1	27.9	2.22	18.6	15.7	5977
	Dec. 4	31.6	33.1	2.32	19.0	16.1	7459
CP 72-370	Sept. 1	28.7	37.6	2.14	17.9	14.8	6128
	Oct. 6	28.5	31.3	2.04	17.5	14.7	6005
	Nov. 11	23.7	27.9	2.06	18.0	15.0	5129
	Dec. 4	27.7	30.0	2.16	18.3	15.3	6165
CP 74-383	Sept. 1	33.3	36.7	2.21	18.0	15.0	7192
	Oct. 6	30.2	36.1	2.18	17.8	14.7	6389
	Nov. 11	27.7	33.3	2.19	17.8	14.8	5922
	Dec. 4	33.2	34.8	2.28	18.1	15.2	7300
CP 76-331	Sept. 1	31.5	33.6	2.53	18.3	15.4	7020
	Oct. 6	33.9	36.4	2.40	18.6	15.5	7622
	Nov. 11	32.0	33.6	2.25	18.9	15.8	7366
	Dec. 4	34.4	33.1	2.46	19.3	16.3	8172
LSD .05		1.9	3.6	0.26	0.6	0.7	635
			Mean harvest date effect				
	Sept. 1	35.9	31.3	2.29	18.1	15.2	6884
	Oct. 6	34.1	30.3	2.24	18.0	15.1	6623
	Nov. 11	30.6	27.4	2.18	18.3	15.3	6099
	Dec. 4	32.8	31.7	2.31	18.7	15.7	7274
LSD .05		1.8	1.0	NS	0.3	0.3	318

The plant cane of each variety was harvested on four dates in 1986 and the yield of the following first stubble cane was measured in November of 1987.

Table 13. Effect of date of harvest on the yield of four varieties of plant cane on Commerce soil on the St. Gabriel Research Station, 1987.

Variety of cane	Date of plant cane harvest 1987	Plant cane yield T/A	Stalk wt. lbs.	Normal juice Brix %	Normal juice Sucrose %	Sugar yield lbs./A
CP 70-321	Oct. 1	19.5	2.12	16.5	13.5	3711
	Nov. 2	22.6	2.30	17.9	14.8	4809
	Dec. 1	21.5	2.64	18.3	15.6	4862
CP 72-370	Oct. 1	20.1	2.27	16.6	13.5	3855
	Nov. 2	27.0	2.23	17.3	14.1	5408
	Dec. 1	26.3	2.50	17.5	14.6	5513
CP 74-383	Oct. 1	24.0	2.29	16.6	13.4	4543
	Nov. 2	25.3	2.31	16.9	13.6	4889
	Dec. 1	28.5	2.56	17.2	14.5	5956
CP 76-331	Oct. 1	27.8	2.30	16.9	13.5	5306
	Nov. 2	31.0	2.75	18.1	14.7	6565
	Dec. 1	34.0	3.12	18.8	15.9	7901
LSD .05		3.0	0.35	0.9	0.9	796
			Mean harvest date effect			
	Oct. 1	22.8	2.25	16.6	13.5	4354
	Nov. 2	26.5	2.40	17.6	14.3	5418
	Dec. 1	27.6	2.70	18.0	15.2	6058
LSD .05		1.5	0.17	0.5	0.4	398

The plant cane of each variety was harvested on four dates and the yields were measured on the last three harvest dates.

Table 14. Effect of stubble protection after three harvest dates of two cane varieties on the yield of the subsequent stubble crop on the St. Gabriel Research Station, 1987.

Date of plant cane harvest	Stubble protection treatment	Stubble yield 1987	Stalk		Normal juice		Sugar yield
			No.	Wt.	Brix	Sucrose	
1986		T/A	1000/A	lbs.	%	%	lbs./A
				CP 65-357			
Oct. 6	Check	25.4	24.0	2.36	17.8	14.2	5155
	Cover	24.2	23.8	2.26	17.9	14.3	4927
Nov. 10	Check	28.8	29.2	2.57	18.0	14.5	5998
	Cover	27.9	22.8	2.46	17.5	14.1	5609
Dec. 2	Check	27.5	25.3	2.21	17.9	14.5	5704
	Cover	30.6	25.4	2.45	17.7	14.1	6122
				CP 72-370			
Oct. 6	Check	29.7	28.9	2.40	17.9	14.2	6039
	Cover	27.2	25.5	2.04	17.6	13.8	5352
Nov. 10	Check	24.6	26.3	2.00	17.6	14.1	4928
	Cover	25.0	19.4	1.94	17.2	13.9	4946
Dec. 2	Check	22.5	23.8	2.21	17.7	14.3	4593
	Cover	29.0	28.3	2.45	17.5	14.2	5869
LSD .05		2.4	5.1	0.33	NS	NS	601

The cane stubble was protected from freeze damage by covering it with soil immediately after each harvest date in 1986. The soil cover was removed in early spring and the stubble crop was harvested in November, 1987.

Table 15. Effect of varieties, Furadan and stubble protection on the yield of second stubble cane on a Commerce silt loam soil at the St. Gabriel Research Station, 1987.

Variety of cane	Stubble protection treatment	Cane yield	Stalk		Normal juice		Sugar yield
			No.	Wt.	Brix	Sucrose	
		T/A	1000/A	lbs.	%	%	lbs./A
			No Furadan Check				
CP 70-321	Check	28.1	31.1	2.54	18.0	14.9	6032
	Cover	32.2	33.7	2.52	18.9	15.6	7290
CP 72-370	Check	23.3	31.8	2.31	17.8	14.3	4889
	Cover	29.7	34.9	2.31	17.7	14.1	5984
CP 74-383	Check	27.5	35.6	2.39	17.8	14.7	5777
	Cover	31.8	36.0	2.23	17.3	13.7	6172
			Furadan - 10 lbs./A				
CP 70-321	Check	28.3	33.0	2.35	18.3	14.9	6064
	Cover	31.2	32.8	2.50	18.6	15.4	6966
CP 72-370	Check	26.7	33.8	2.11	18.1	14.9	5763
	Cover	30.3	35.0	2.22	17.9	14.4	6251
CP 74-383	Check	30.4	36.4	2.08	18.1	14.8	6486
	Cover	34.7	37.6	2.34	17.7	14.2	7048
HSD .05 Treat.		2.1	3.0	0.36	0.6	0.9	510
			Mean cover effect				
	Check	27.5	33.6	2.30	18.0	14.8	5835
	Cover	31.7	35.0	2.35	18.0	14.6	6619
LSD .05 Means		0.9	1.2	NS	NS	NS	208

Stubble protection consisted of covering the cane stubble after harvesting the first stubble crop in 1986 and removing the cover in the early spring of 1987.

SUBSURFACE DRAINAGE

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Rainfall and Yields:

Louisiana state average cane yields in 1987 were much lower than in 1986 but sugar content (lbs of sugar/ton of cane) was the highest on record. This low cane yield and high sugar content has been attributed by some to low rainfall in 1987. Monthly and annual rainfall at seven locations, where recording rain gauges are maintained in South Louisiana, are shown in Table 1.

Table 1. Monthly, Annual, and Long Term Average Rainfall at Seven Locations in 1987.

	Location (Parish)						
Month	E.BR	Iberv.	St.Jm.	Assum.	Terreb.	St.Mary*	Iberia
	Rainfall (Inches)						
Jan.	7.79	7.61	6.10	6.33	7.35	6.84	6.58
Feb.	7.60	6.82	8.91	7.81	4.00	6.45	5.17
Mar.	4.31	3.08	3.73	4.79	5.45	2.59	1.86
Apr.	0.90	1.07	2.38	2.09	2.63	0.40	0.66
May	6.65	5.96	7.37	9.33	6.70	4.12	3.43
June	12.25	10.02	10.91	12.89	10.36	14.36	12.48
July	4.71	5.36	7.00	4.73	8.54	5.80	7.05
Aug.	10.51	5.76	5.19	4.51	8.28	6.77	9.67
Sept.	1.37	0.51	0.81	1.08	2.38	1.27	1.39
Oct.	0.96	0.95	1.38	1.17	0.97	1.96	1.31
Nov.	4.37	3.30	4.74	4.61	2.82	4.38	4.96
Dec.	2.30	1.51	2.53	2.20	3.08	3.31	2.76
ANNUAL	63.72	51.95	61.05	61.54	62.56	58.25	57.32
AVERAGE	55.77	55.77	60.36	60.36	63.89	61.87	58.97

* Data from Sterling's rain gauge at the sugar mill.

When total rainfall amounts were considered, 1987 was near or above average at most locations. Only at St. Gabriel in Iberville Parish and Sterlings in St. Mary Parish was annual rainfall more than 3 inches below average. When monthly rainfall is considered, several critical months (during the boom growth stage) had low rainfall. Thus, rainfall distribution was the major factor in low cane yields and high sugar content during 1987. Rainfall during March, April, July, September, and October were below average at most all locations. The low rainfall in July, September, and October probably adversely affected cane yields. On the other hand, low rainfall during these months is attributed to enhancing sugar content of the cane. Similar phenomena was observed and measured in water table control experiments in Baton Rouge during the late 1960s and in the 1970s. In small plot studies, soil water treatments that were favorable to cane growth (high

cane yields) usually had relatively low sugar content. On the other hand, soil water treatments that resulted in slow growing (low yielding) cane usually had relatively high sugar content.

Subsurface Drainage Field Tests Results:

The results of three subsurface drainage field experiments in 1987 are shown in Table 2. Differences in yields between subsurface drained and nondrained areas were small in 1987 at Sterlings and Patouts. However, at Graugnards, a good response to subsurface drainage was indicated. The drained area yielded 619 lbs/A more sugar than did the nondrained area (Table 2).

Table 2. Cane and Sugar Yields at Three Locations in 1987.

Location	Soil Type	Crop Year	Drained * ---Yields---- Cane** (T/A)	Drained * ---Yields---- Sugar (lb/A)	Nondrained ----Yields---- Cane** (T/A)	Nondrained ----Yields---- Sugar (lb/A)
Graugnards (St. James)	sil	1	27.57	5437	25.73	4818
Sterling (St. Mary)	sic	3	21.87	4728	22.95	5012
Patouts (Iberia)	sicl	4	18.79	4896	20.67	4721

* Drains were spaced 80 feet apart at Graugnards and 45 feet apart at Sterlings and Patouts.
** The sugarcane variety was CP 70-321 at all three locations.

Iron Ochre, a Potential Subsurface Drain Problem:

Questions are often asked about the longevity of a subsurface drainage system. Since the subsurface drain tubes are made of polyethylene (plastic), they should last a very long time, perhaps 75 to 100 years. The potential problem that threatens drain longevity is clogging with sediment or with compounds that may form in the drains such as iron ochre. In some Louisiana soils, the clogging of drains with sediment is a potential problem and precautions must be taken, such as installing drains with a sock, to prevent sediment from entering and depositing in the drain tube.

Ochre, however, has never been established as a potential problem. Iron ochre, a red to tan gelatinous slimy deposit, has been observed in the drain outlets of several drainage systems in South Louisiana but not in others. Iron, a component of ochre, is found in most soils but not always in the ferrous form which is necessary for ochre formation. Soils with total iron but no evidence of ferrous iron may still be a candidate for ochre formation since flooding the soil can cause the iron to change its form from ferric to ferrous.

Interest in quantifying the ochre potential in South Louisiana prompted a survey to determine the presence of iron in water samples taken from soils in seven Parishes. Criteria was needed to determine which soil types were

likely for ochre formation so that in future subsurface drain installations, particular attention could be given to those soil types when designing subsurface drainage systems.

The locations selected for the survey were those with subsurface drainage systems where ochre could be observed if it were present in the drain outlets. A test kit developed specifically for estimating iron concentrations in water in the field was used. Water samples were collected from holes that were augered to depths just below the water table. The kit included a small plastic container for collecting water samples, a Swinnex 47 mm diameter filter holder, filters (.45 um), syringes for handling the water sample, sulfamic acid-phenanthrolene reagent for treating the filter, an iron reagent for total iron determinations, and a cube color scale and reservoir for matching the color of the sample to obtain an estimate of the ferrous and total iron concentrations. In this survey, a positive test for total iron was considered as an indication that ochre formation was possible, whereas the presence of ferrous iron indicated that ochre formation was likely.

The standards used to indicate the severity of the ochre problem were as follows: the potential for ochre was considered slight when tests indicated that ferrous iron was present but its concentration was less than one mg/l. The potential for ochre was considered severe if the indicated concentrations were 3 mg/l or more.

Ferrous iron was measured in water samples at five of nine subsurface drainage sites. Ochre was observed in the drain outlets at five of nine sites. The same sites at which ferrous iron was measured also had ochre, with two exceptions: 1) the Commerce site in St. James Parish where no ferrous iron was measured but considerable amounts of ochre were observed and 2) the Baldwin soil in St. Mary Parish where ferrous iron was indicated by the tests but no ochre was observed in the drain lines.

The site with the highest iron concentration (more than 5 mg/l) and the most ochre accumulation in the drain outlet pipe was the Commerce silt loam soil in Terrebonne Parish (USDA farm at Chacahoula). Although ochre accumulated to more than half the depth of the pipe diameter, the drains were never clogged. Rainfall usually occurred before the pipe filled with ochre and the resulting increase in drain outflow flushed most of the ochre out of the drain outlets. The drains at this site have been functioning satisfactorily since they were installed in 1977.

Ferrous iron concentrations of 2 mg/l were measured in a Mhoon silty clay loam soil on the Crescent farm also in Terrebonne Parish. Ochre formed readily in the drain outlet pipes and coated the sump, pump, and plumbing. This drainage system was installed in 1972 but abandoned in 1976 when land ownership changed. In 1976, several drains were excavated and examined for ochre. Some accumulation of both reddish and black slimy substances was found but accumulation was restricted mainly to the grooves of the corrugated drain tubes. This system, like the one on Commerce soil in Terrebonne Parish, was flushed by increased drain flows during large rainstorms.

A site at which measurements indicated no ferrous iron on one occasion but high concentrations of iron on another occasion was Baldwin sic at Sterlings in St. Mary Parish. Measurements were made about a month apart and at different depths. Water samples for the first test, when no ferrous iron was indicated, were from 122 to 165 cm below the soil surface. The second

measurements were made when the water table was over 200 cm below the soil surface. At these deeper depths, ferrous iron was 3 mg/l and iron total was over 5 mg/l. In spite of the high iron measurements, ochre has not been observed in the drain outlets. Apparently, iron is in the soil but at a depth far enough below the drains that it does not affect them.

The Commerce sil site in Assumption Parish (Westfield) has potential for ochre formation. Total iron in the water samples was 3 mg/l while ferrous iron concentrations were less than one. Ochre was observed in the drain outlets at this site but very little has accumulated. This system was installed in 1983 and used for water table management which kept the drain lines submerged most of the time.

Iron concentrations at the East Baton Rouge Parish site (LSU's Ben Hur Farm) were higher than those at St. James but ochre accumulation was observed only at St. James. The drainage systems were installed in East Baton Rouge in 1975 and in St. James in 1976. The subsurface drains at both sites were still working satisfactorily in 1987.

Water samples from Sharkey clay, Convent loam, and Jeanerette silty clay loam in Iberville (St. Gabriel), Iberville (St. Gabriel), and Iberia (Patouts) Parishes, respectively, did not show high potentials for ochre formation in the water samples and ochre was not observed in the drain outlets of the subsurface drainage systems. The drainage systems were installed on the Sharkey soil in 1977 and on the Convent and Jeanerette soils in 1978.

The conclusions reached from the iron survey were that Commerce and Mhoon soils have a higher potential for ochre formation than does Sharkey clay, Convent loam, or Jeanerette silty clay loam. Thus, when subsurface drainage systems are planned for Commerce and Mhoon soils, measures to control ochre such as keeping the drain lines submerged or using anti-ochre drain tubes and/or envelopes, should be included in the design of the drainage system. Baldwin soil showed high potential at deep but not at shallow depths. Since no ochre was observed in the drain outlet, it is considered as having low ochre forming potential at shallow (< 200 cm) depths.

The National Cooperative Soil Survey of Louisiana Parishes

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Agronomy Department

During 1987, approximately 1,393,000 acres were mapped by the USDA-Soil Conservation Service (SCS), the U.S. Forest Service (USFS) and the Louisiana State Department of Transportation and Development (DOTD). The mapping was completed in Livingston, Plaquemines, Vermilion and Richland Parishes. The soil survey was begun in Bienville, East Feliciana, and Vernon Parishes. The status of the soil survey of individuals parishes in Louisiana is given in Table 1 and the published reports are available from the Louisiana Agricultural Experiment Station or the USDA - SCS upon request.

Cooperative field investigations, site selection and sample collection, and soil classification studies were conducted on outfield plots used by personnel in Agronomy and a number of other departments and state agencies. Studies of soil field relationships were conducted in Winn, Webster, Livingston, Plaquemines, Sabine, Jefferson Davis, and Vernon Parishes. Information obtained during these investigations helps to understand surtical geology and the pedology of the soils in each particular area and provides essential data for better quality of the survey and, in many cases, allows the survey party to complete the survey more efficiently by accelerating the mapping rate. These data are also used in the preparation of the soil survey manuscript. The special cooperative studies between the USDA-SCS National Soil Survey Laboratory in Lincoln were continued. The soil survey reports for Avoyelles, Catahoula, St. Landry, Grant and St. Charles Parishes were published and distributed.

The LAES Soil Characterization Laboratory completed physical, chemical and mineralogical characterization on 11 pedons for a total of 85 samples. Soil profile fertility level, exchangeable Al and H, and extractable acidity analyses were completed for 68 soils or 405 samples.

Eight cooperative soil survey manuscript sections were written during 1986. These include sections on the Natural Fertility Levels of the Soils, Characterization of Soils, Formation of the Soils and Landforms and Surface Geology. These sections are a significant portion of each parish soil survey report.

Several special research projects as part of, or that support the cooperative soil survey continue to be a major part of the cooperative soil survey program. The results of which may be found as part of other departmental reports.

Table 1. Status of soil surveys in Louisiana parishes.

	WITH MODERN SOIL SURVEYS			WITHOUT MODERN SOIL SURVEYS	
Parish	Published	Completed to be published	In progress, with completion date set	Old published survey out of print	No published survey
				(Modern soil surveys being conducted on scattered individual tracts only)	
Acadia	x				
Allen	x				
Ascension	x				
Assumption	x				
Avoyelles	x				
Beauregard				x	
Bienville			x		
Bossier*	x				
Caddo	x				
Calcasieu		x			
Caldwell		x			
Cameron		x			
Catahoula	x				
Claiborne		x			
Concordia		x			
DeSoto		x			
E. B. Rouge	x				
East Carroll	x				
E. Feliciana			x		
Evangeline	x				
Franklin	x				
Grant	x				
Iberia	x				
Iberville	x				
Jackson					x
Jefferson	x				
Jeff Davis			x		
Lafayette	x				
Lafourche	x				
LaSalle		x			
Lincoln				x	
Livingston		x			
Madison	x				
Morehouse	x				
Natchitoches		x			
Orleans		x			
Ouachita	x				
Plaquemines		x			
Pt. Coupe	x				

Table 1. (Continued).

	WITH MODERN SOIL SURVEYS			WITHOUT MODERN SOIL SURVEYS	
Parish	Published	Completed to be published	In progress, with completion date set	Old published survey out of print	No published survey
				(Modern soil surveys being conducted on scattered individual tracts only)	
Rapides	x				
Red River	x				
Richland		x			
Sabine			x		
St. Bernard		x			
St. Charles	x				
St. Helena					x
St. James	x				
St. John	x				
St. Landry	x				
St. Martin	x				
St. Mary	x				
St. Tammany		x			
Tangipahoa		x			
Tensas	x				
Terrebonne	x				
Union			x		
Vermilion		x			
Vernon			x		
Washington			x		
Webster			x		
W. B. Rouge	x				
W. Carroll	x				
W. Feliciana					x
Winn			x		

* Modern Soil Survey Out of Print.

Soil Testing Laboratory

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Agronomy Department

Laboratory Operations

Workload

The total number of soil samples analyzed in 1987 was 14,020. This was a decrease of over 11,000 samples from 1986. The major reason for the decrease was that in Jan., 1987 the Soil Test Lab began charging fees for all analyses. Prior to that date, soil tests were run free of charge for all clients and the cost of operating the lab was supported by state funds. The cost of operating the lab (excluding salaries) is now covered entirely by revenue raised by charging fees to clients. Poor weather and the poor state of the farm economy in certain sectors also contributed to the decrease in sample workload. Other soil test labs in other states reported that their sample numbers had also declined.

New Forms

A completely revised information form for farm and home garden samples was introduced in 1987. The new form requests less information than past forms and contains a list of soil tests offered by the lab. Clients can now check the appropriate boxes on the form to indicate which tests they want run. New instructions for sampling and completing the form were also prepared. Complete soil test kits are now available from the lab for farm and garden soil samples. Each kit consists of a letter describing the soil test program, a fee schedule, an information form, instructions, a soil map of LA, and four soil sample boxes.

Irrigation water sample kits were also introduced in 1987. Each kit consists of a sample bottle, information form, instructions, and a mailing container.

New Equipment

Several new items of equipment were installed in the Soil Test Lab in 1987. These include:

- Thermo Jarrell-Ash Model 61 Inductively Coupled Plasma Emission Spectrophotometer with 240-place random access autosampler an IBM AT computer for instrument control and data processing. This instrument is configured for the following elements: Na, K, Mg, Ca, Mn, Fe, Ni, Cu, Zn, Cd, B, Al, Pb, P, As, and S.

- Instrumentation Laboratory Model 440 Atomic Vapor Accessory for Hg Analysis by the cold vapor method and As and Se analysis by the hydride method. This instrument is connected to the Perkin-Elmer Model 5000 Atomic Absorption Spectrophotometer, which was formerly

used for determination of the exchangeable cations.

- Orion Model EA920 pH meter

- Brinkmann Instruments Model PC801 Dip-probe Colorimeter of the determination of oxidizable organic matter by the Walkley-Black method

- American Scientific Products Model Z-410 Top-loading Balance for recording the weights of scooped samples.

The ICP was purchased with funds provided by the LSU Agricultural Center, the AVA was purchased with grant funds, and the other equipment items were purchased with Soil Test Lab revenue. The acquisition of these equipment items together with the new fee schedule for raising operating funds has resulted in a complete upgrade of the lab. The lab is now operating at a state of the art level and is providing consistently reliable data to its clients.

New Procedures and Services

Because of the upgrade of the lab several new procedures are in use and new services have been offered. Exchangeable Na has been included in the routine soil tests since the ICP was put into operation in June, 1987. Documentation for the change to the ICP is given in a later section of this report. Since the ICP has a much wider dynamic range than the formerly used autoanalyzer for P analysis and AAS for exchangeable cations analysis, the soil test results are no longer constrained to upper limits of 300, 500, 1000, and 4000 ppm for P, K, Mg, and Ca, respectively. Previously, soil test results for these elements in excess of the upper limits could not be reported unless manual dilutions were done or smaller sample sizes were used. Now, the actual results of all soil tests determined using the ICP are reported regardless of magnitude. The sum of the exchangeable bases (Na + K + Mg + Ca) in terms of meq/100 g is now routinely reported for all soil samples. For nonacid soils the sum of exchangeable bases will closely approximate the cation exchange capacity.

Soil samples for extractable P and exchangeable cation analyses are now scooped for extraction using a 2-cm^3 scoop and soil test results are computed using the ICP data adjusted by the weights of the 2-cm^3 soil samples. Previously, 2.5-g sample were weighed for these tests. Since scooping subsamples for analysis is much faster than weighing out samples for a given weight, considerable time has been saved. Furthermore, the exact weight of each 2-cm^3 scooped sample is determined and volume weights in g/cc are calculated and reported with the soil test results. This allows for conversion of the soil test results from a weight basis to a volume basis if desired. Documentation for the change from weighing to scooping is provided in a later section of this report. Since the soil samples are dried and ground to produce uniform samples, the volume weights reported are not equivalent to bulk densities of undisturbed cores taken in the field.

A new organic matter calibration curve has been prepared for use with

the new dip-probe colorimeter. The new meter was found to be significantly more sensitive than the old meter, thus a new curve was necessary since the same samples will give higher absorbances on the new meter than on the old.

The hot water extraction procedure for B was changed. A 10-g soil sample is now refluxed for 15 min with 20 mL of boiling water in 200-mm glass tubes in a block digester. Small funnels are placed at the top of the tubes to promote the reflux action of the water. This procedure replaced the formerly used procedure of shaking a 10-g soil sample with 40 mL of water in an 80C water bath for 30 min. The new procedure allows for 40 samples to be extracted in each set vs. 16 samples by the old procedure. Reasons for the change were given in the 1986 Annual Report of Projects for the Agronomy Department, but basically the old procedure was never calibrated, did not extract enough B, was too slow, and did not allow for many samples to be extracted at one time. Documentation for this change is provided in the discussion below.

DTPA or HCl extractable Ni, Cd, and Pb soil tests are now available from the lab.

Irrigation water samples are now analyzed routinely for pH, soluble salts, Na, Ca, and Mg, and the Sodium Adsorption Ratio (SAR) is calculated from the data. Sulfur, Mn, and Fe in water are now available as optional analyses. Previously, each analysis in the routine irrigation water analysis package had to be specifically requested.

Data Acquisition and Processing

Because of the new equipment, automatic data acquisition became a reality in the Soil Test Lab in 1987. The lab now has three computers: an IBM AT, an IBM CS/9000, and an IBM PC. The manner in which these computers are used for automatic data acquisition from the instruments used for each analysis is outlined below:

- IBM AT: This computer controls the operation of the ICP and autosampler. Data from the ICP are automatically acquired by the computer for subsequent processing. The AT is connected to the CS/9000 for data transfer.

- IBM CS/9000: Data from the new pH meter are sent to the CS/9000 for storage in a disk file. A printout of the data is also provided. Previously, pH data were recorded by hand. The weights of the scooped soil samples are also sent to the CS/9000 from the new balance. The weight data are stored in a disk file and a printout of the data is also provided. The pH and weight data are transferred to the AT for merging with the ICP data. Computer programs in fortran were developed in the lab for data acquisition and transfer by the CS/9000.

- IBM PC: Absorbance data from the new dip-probe colorimeter used in the Walkley-Black method of organic matter determination are sent to the PC. The data are stored in a disk file and subsequently merged with data stored on the AT. The absorbance data are used to

calculate oxidizable organic matter on the AT computer. The PC is also connected to the CS/9000 for data transfer from the CS/9000 when the AT is in use by the ICP. Computer programs in basic were developed in the lab for data acquisition and transfer by the PC.

The database and spreadsheet modules of the 'Enable' software package are used to merge and process the data sent to the AT computer for each set of samples. The analysis results are sent to the Soil Testing Office run by the LA Cooperative Extension Service for preparation of reports that are subsequently sent to extension agents for interpretations and recommendations before being sent to the clients. Data processing and reports for irrigation water samples are still done using the CS/9000. Data processing and reports for research samples, which were formerly done with the CS/9000, are now handled by the AT. Spreadsheet printouts of the results along with copies of the information forms submitted with the samples are sent to researchers. In some cases files of the results on diskettes are being provided as an extra service.

Research Program

The following discussion is a summary of research activities within the Soil Test Program in 1987. For further information, reprints, computer programs, etc. readers should contact the senior author.

Boron

The hot water extraction procedure for B was changed as previously discussed. The new hot water extraction procedure was compared to the traditional reflux procedure used by most labs. The traditional reflux procedure consists of refluxing a 1:2 soil-water suspension for 5 min in a flask-condenser unit. This procedure was used by Sedberry et al (1969) to obtain B deficiency/sufficiency calibration data for cotton. A group of over 30 soil samples with a wide range in extractable B content was extracted by both the traditional reflux procedure and the new procedure using a block digester. The results are shown in Figure 1. Both procedures compare favorably, but the new method tends to extract more B from most soil samples, since most data points are above the line that indicates exact equivalence between the methods.

The traditional reflux method has been criticized for using too short a reflux time. Some soils may release additional quantities of B with longer reflux times. It has been recommended that soils be refluxed until constant amounts of B have been released. The effect of reflux time on B release from three soils was investigated using the block digester procedure and the results are shown in Figure 2. Most of the hot water extractable B in these three samples was released using 15 or more min of reflux time. The 15 min time period was chosen for routine use because it represents an effective compromise between the need to reflux for a long enough time period to release most of the hot water extractable B and the need to keep the extraction time short enough to be able to use the method routinely with large numbers of samples.

Scooping vs. Weighing

As already discussed the Soil Test Lab changed from weighing 2.5 g of soil for extractable P and exchangeable cation analyses to scooping 2 cc of soil and recording the scooped weights to calculate the final soil test results on a weight or volume basis. Many Soil Test Labs scoop samples because the method is much faster than weighing individual samples to the same weight. The scooping method is reliable only if consistent scooping technique is used by lab personnel. The difference in sample weights scooped by two research associates for each soil sample in a set of 120 samples is shown in Figure 3. Only one sample had a difference of about 0.5 g between the two scooped subsamples. Most of the other samples had differences of less than 0.3 g. Consistency in scooping is related to soil texture when the same scooping technique is used. Soil samples with non-uniform textures have the most variability in scooped weights. The same soil types also have the most variability in soil test results using weighed samples. Thus, sampling variability is the major problem with such soils.

A comparison of soil test results for scooped vs. weighed samples was done and the results for P and K are shown in Figures 4 and 5. Similar results were obtained for Mg and Ca. It is clear that equivalent results were obtained in the vast majority of cases regardless of whether scooped or weighed samples were used. Greater variability is seen at very high levels where no fertilizer would be recommended. Observed variability is not excessive in any case.

Instrument Comparisons

Comparisons of analytical data for P and K obtained with the autoanalyzer and AAS, respectively vs. the new ICP were done. The results are shown in Figures 6 and 7. Similar results were obtained when AAS data were compared to ICP data for Mg and Ca. The ICP clearly gives results equivalent to those obtained by the autoanalyzer and AAS. Slightly more variability was observed in P data than in K data, but this variability is relatively minor and occurs primarily at very high P levels.

New Extractants

Research on comparing soil tests currently in use by the lab with other methods such as Mehlich II, Mehlich III, and Soltanpour is continuing. A reference set of over 500 samples representing soils from all soil areas in Louisiana has been assembled and is being analyzed by all the methods under investigation. Results from this study will be used to provide correlations between various methods.

Modeling Sulfur Uptake

This project begun in 1984 has ended with the completion of a PhD dissertation by Jorge Delgado (Delgado, 1987). The abstract of the dissertation is given below and will serve as a summary of the project.

The Barber and Cushman mechanistic model of element uptake by plants was

used to help elucidate the mechanisms that govern the movement of S in soils and S uptake by plants. Sulfur uptake predicted by the model was compared to measured S uptake by 'Stoneville 825' cotton (Gossypium hirsutum L.), 'Centennial' soybean (Glycine max L. Merr.), and 'Coker 916' wheat (Triticum aestivum L.) grown on Gallion vfsl (Typic Hapludalf), Mhoon sicl (Typic Fluvaquent), and Norwood sil (Typic Udifluvent) under glasshouse conditions.

Predicted S uptake by the model was significantly correlated with observed uptake. However, the model overpredicted S uptake by all crops on all soils by at least three times and up to 21 times. Better agreement between observed and predicted S uptake could be achieved by decreasing the maximum influx (Imax) values obtained from solution culture experiments. The Imax measured in solution cultures may not be valid for soil studies or the assumption made by the model that Imax is the same regardless of plant age may not be appropriate for roots in soil. If the current model is otherwise valid, Imax appropriate to soils could be fit directly to the uptake data. An alternate explanation of S uptake overprediction is that uptake is controlled by a feedback mechanism that can turn off S uptake when the S requirement of the plant has been met. Such a mechanism is not accounted for by the current model. A modification of the model to account for a possible shutdown mechanism should be considered.

As implemented, the model indicated that the main mechanism for S transport to the roots was water flux. The concentration of S in soil solution appears to be the best index for S availability. The present model does not consider all possible sources of plant S. In addition to the buffer power of the soil, other sources of S including dry and wet deposition and mineralization of soil organic matter need to be quantified if a reliable estimation of S supply through the growing season is to be made.

Retention/release and Transport of Metals

A manuscript on verification of a nonlinear multireaction model for describing kinetics of Cr and Cd retention/release in soils has been accepted for publication and will appear in the March/April issue of the 1988 volume of the Soil Science Society of America Journal (Amacher et al., 1988). A paper on nonlinear and second order multireaction models for describing metal retention/release and transport was presented at an international conference in Nancy, France in June, 1987 and was published in the conference proceedings (Amacher and Selim, 1987). Copies may be obtained from the authors.

Arsenic Survey

A new project on the impact of As on soils and crops in Louisiana was begun. A paper on a survey of the total As content of Louisiana soils was presented at the 1987 Annual Meetings of the American Society of Agronomy in Atlanta, GA. (Ori et al., 1987). The abstract appears below.

The total arsenic (As) content of representative soils used for

agriculture in the major soil areas of Louisiana was determined. The As content of the >400 samples analyzed ranged from 0 to 75 mg/kg with a mean of 24 mg/kg. The normal range for most soils is 1 to 50 mg/kg with a mean of 5 mg/kg. Generally, alluvial soils of the Red and Mississippi Rivers had the highest As contents, while Ouachita River alluvial soils and Coastal Plain soils had the lowest As contents. In general, As levels increased or remained about the same with soil depth. Total As was significantly correlated with soil texture but not with pH or organic matter content. Soils with higher clay contents had higher As contents. Past widespread use of As-containing pesticides does not appear to have substantially increased the As content of agricultural soils in Louisiana.

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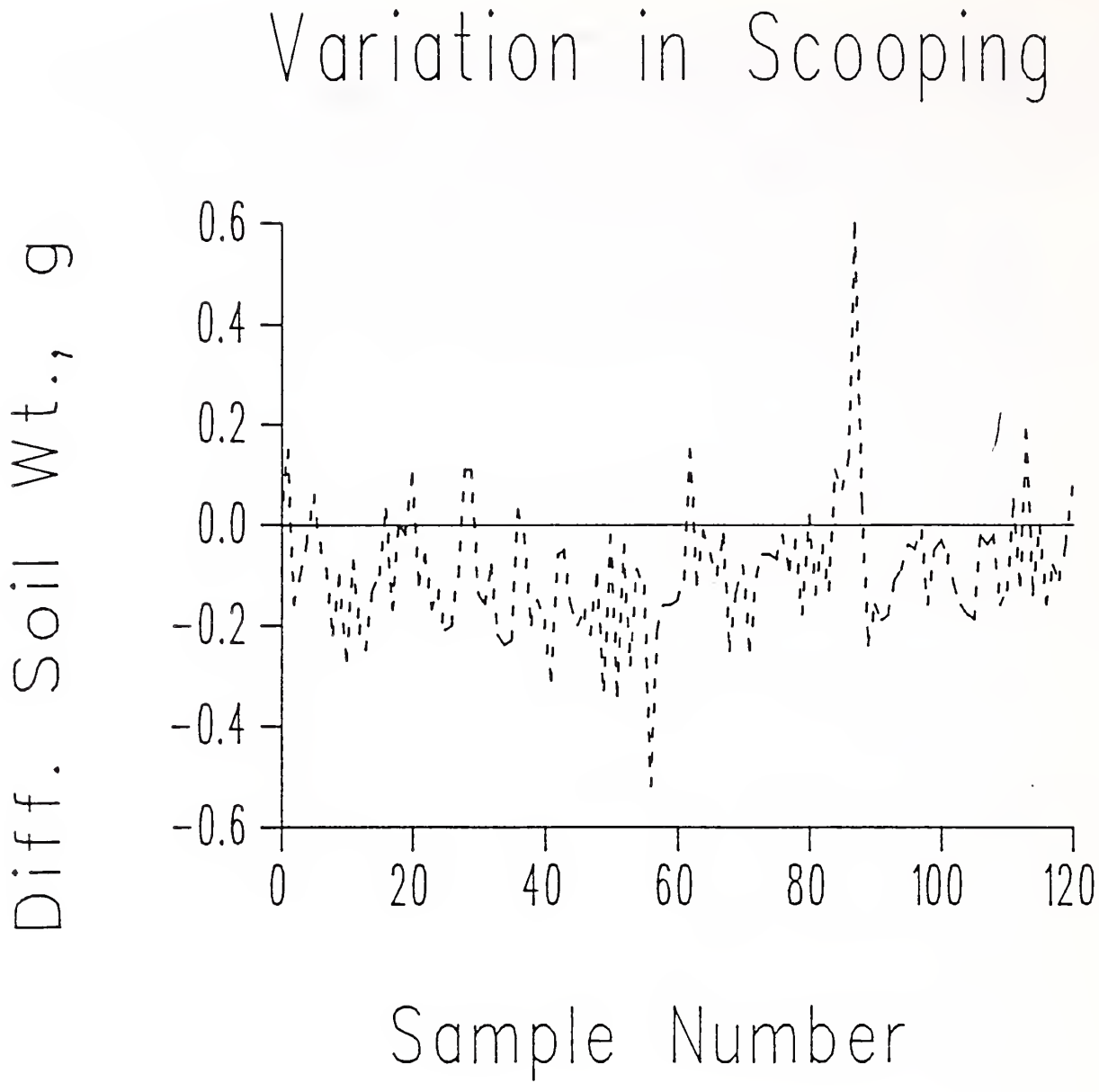


Fig. 3. Difference in soil weights scooped by two research associates.

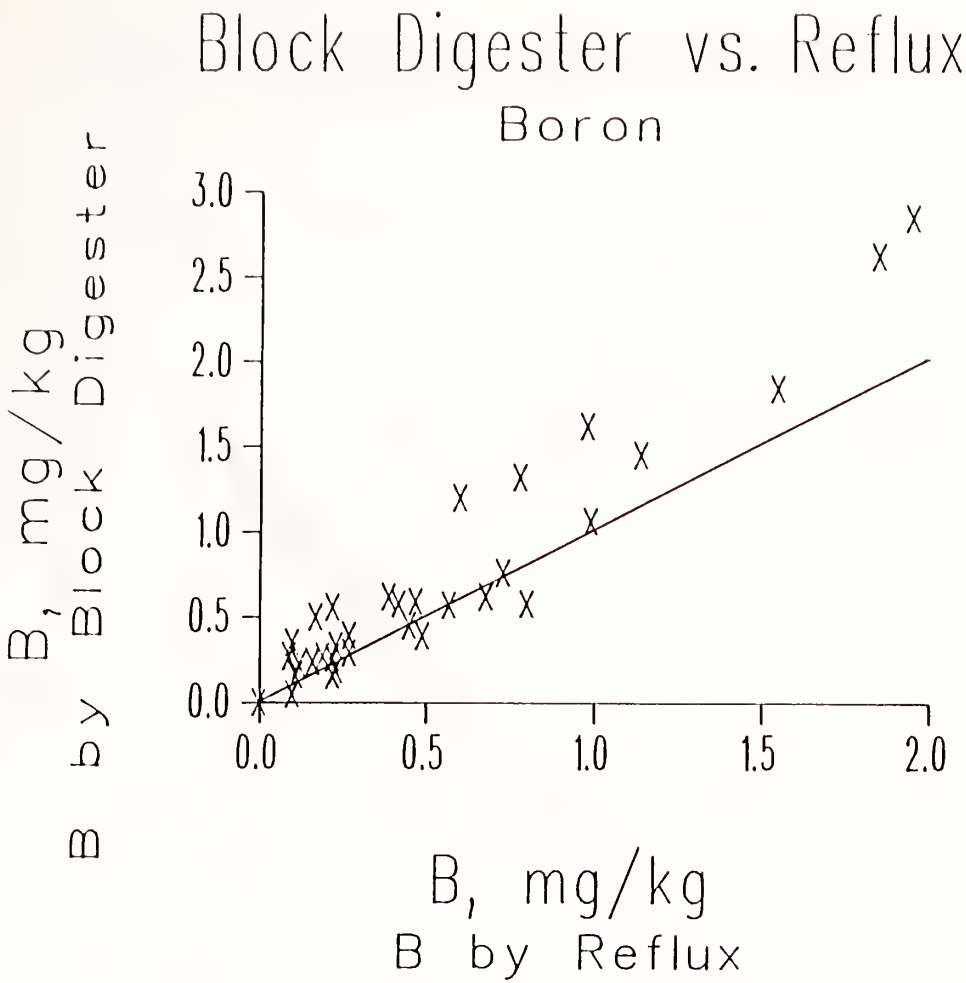


Fig. 1. Comparison of B extraction by 5 min reflux in a flask-condenser unit vs. 15 min reflux in tubes in a block digester.

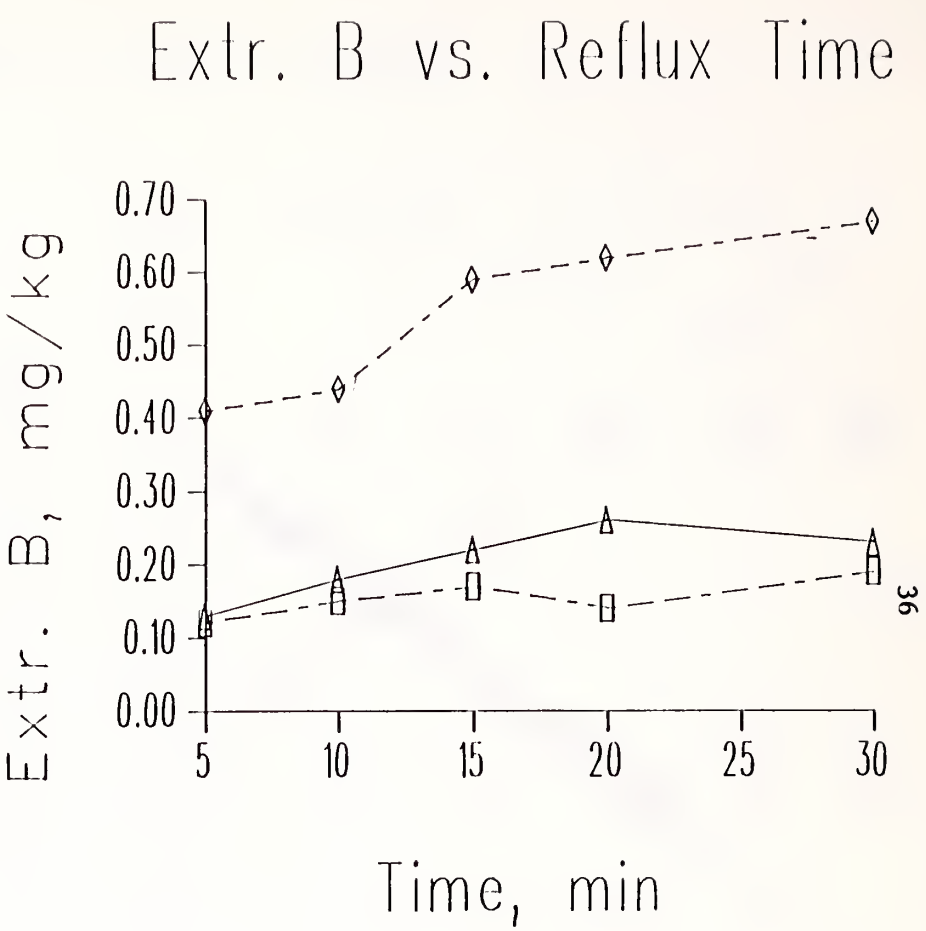
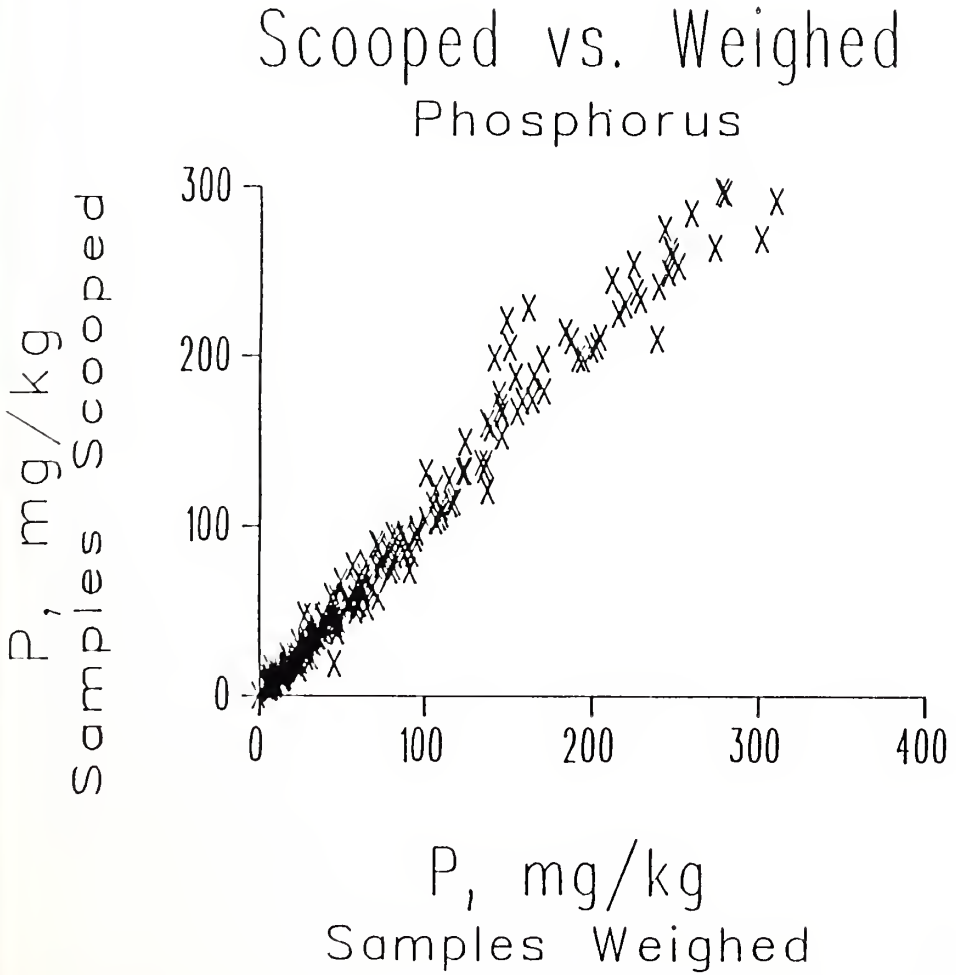


Fig. 2. Effect of reflux time on hot water extraction of B from three soil samples.



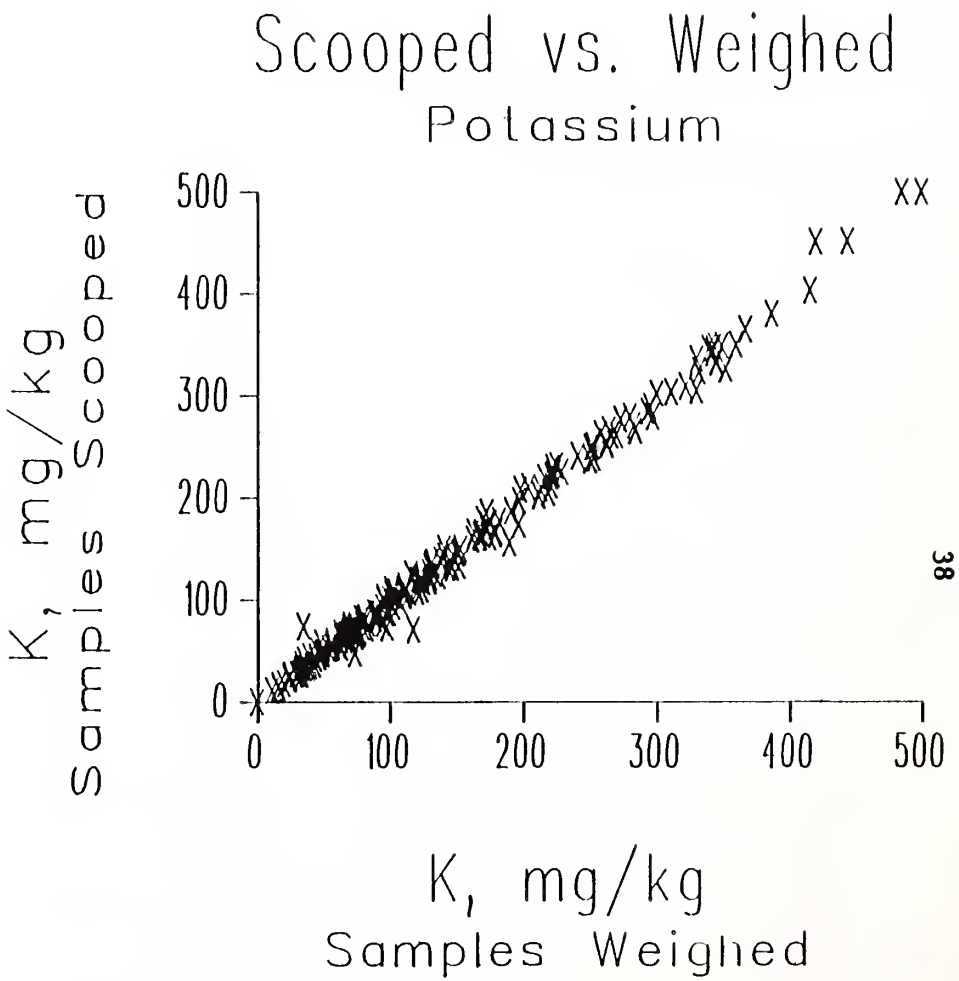
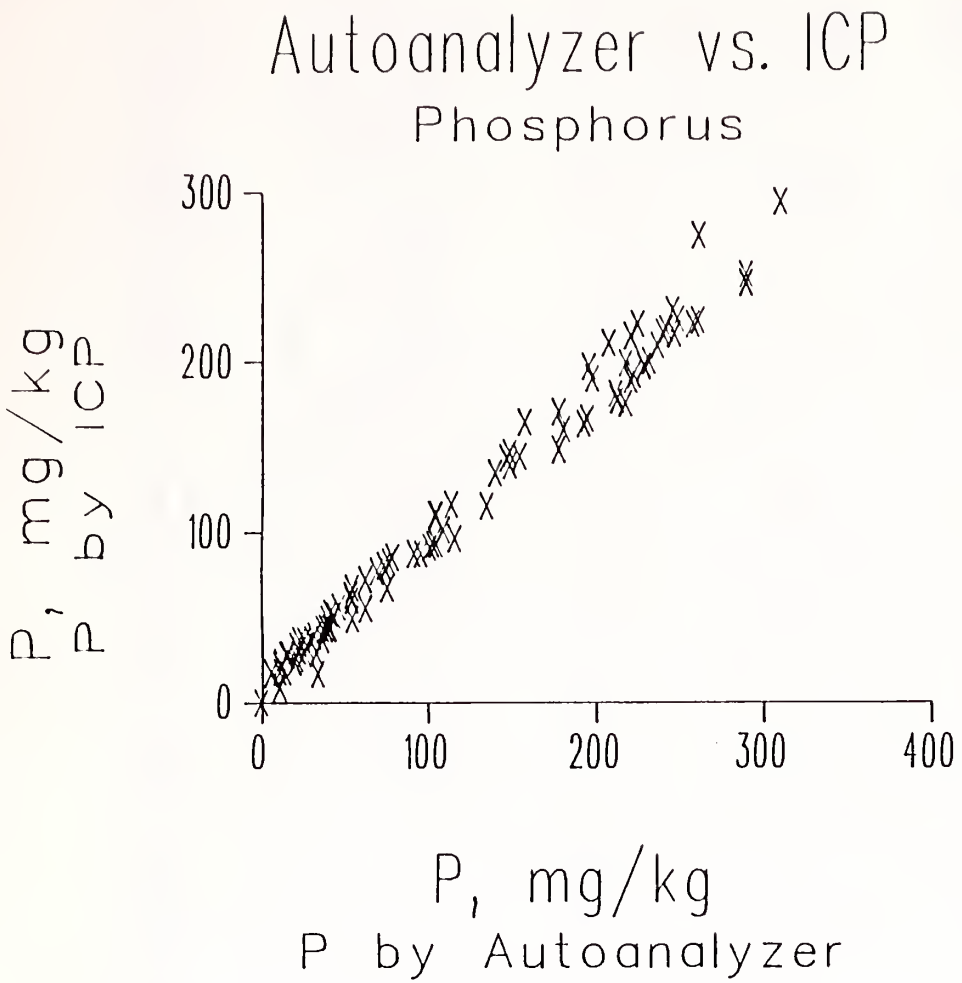


Fig. 4 and 5. Comparison of P and K soil test results for scooped vs. weighed soil samples.



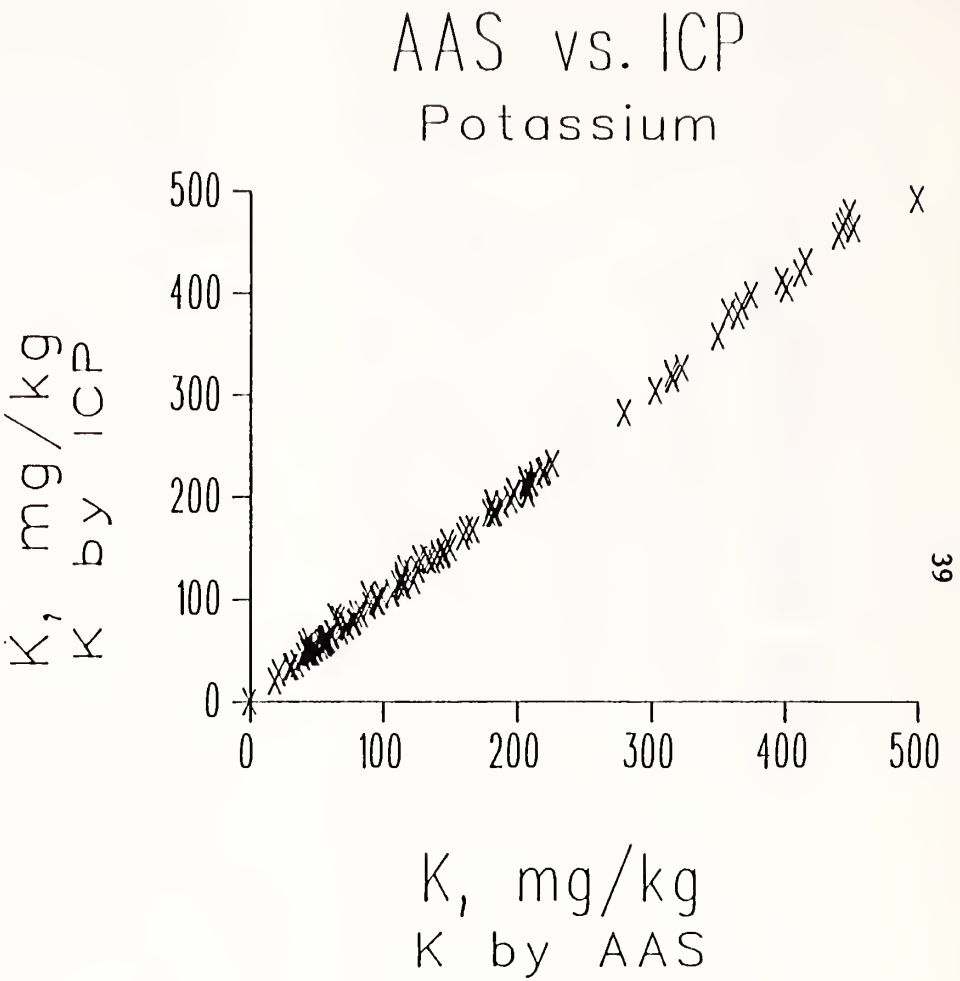


Fig. 6 and 7. Comparison of autoanalyzer vs. ICP for P determinations and AAS vs. ICP for K determinations.

Sweet Sorghum for Biomass and Sugar Production in Louisiana

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Experiments were conducted in 1987 to determine the potential of growing sweet sorghum as a biomass and sugar fermentation feedstock for the production of fuel alcohol. The experiments consisted of a variety x fertilizer rate test on Commerce silt loam soil on the St. Gabriel Research Station and a variety x method of fertilizer application test on an Iberia clay soil on the Iberia Research Station.

St. Gabriel Test

The varieties planted in this test were Wray, M81E and Cowley. The fertilizer treatments were 0-0-0, 90-0-0, 180-0-0, 180-0-80 and 180-0-160 in pounds/A of N, P_2O_5 and K_2O. The sorghum plots were planted in April and each variety was harvested at its mature stage during August and September. The plots were planted in two drills, 22 inches apart on rows spaced six feet apart. The plant spacing was three plants per foot in each drill. The plots were three rows wide and 50 feet long with three replications of each treatment. This method of planting was chosen to accommodate sugarcane harvesting equipment. The fertilizer treatments were bedded in the rows prior to planting. Atrazine was used as a preemergence herbicide and Guthion was used to control sugarcane borers. Furadan was applied at planting time to control lesser corn borers.

The plant population and yield of stalks, leaves and tops were measured at harvest time of each variety. Also, the percent brix or total sugar solids and sucrose in the sorghum juice and percent fiber in the stalks were measured at harvest time. The brix and sucrose were determined with a refractometer and polariscope, respectively. The total fermentable sugars were calculated from a predetermined relationship between liquid chromatograph analyses for total sugars and brix analyses expressed by the equation % total sugars = % Brix - .70. The alcohol yield was calculated from the theoretical conversion of .07 gallon of alcohol per pound of fermentable sugar.

Biomass Yield. The data obtained on biomass yield in the St. Gabriel test are reported for individual treatments in Table 1 and for factorial mean effect in Table 2. The plant population was adjusted by thinning to three plants per foot in each drill and there were no differences in population among varieties at harvest time. The M81E variety produced a higher average stalk weight than the other varieties. Each fertilizer treatment applied increased the stalk population and weight above the check plot, but the differences among treatments were small.

The fiber content in the stalks which indicates percent juice extraction ranged from 14.0% in Wray to 16.8% in Cowley and was not affected by the fertilizer treatments. The net stalk yield without leaves

and tops was significantly higher in M81E (17.1 T/A) than in Wray (15.0 T/A) and Cowley (14.3 T/A). The stalk yield was significantly increased with N application of 90 lbs./A and with 180 lbs./A over the lower rate.

The percent leaves which were mostly still green at harvest time was significantly higher in Cowley (21.2%) than in Wray (16.7%) and M81E (16.9%). The percent tops which included the seed heads was significantly higher in Cowley (5.7%) than the other varieties. Cowley was lower in percent stalks, and higher in percent leaves and tops than the other varieties. The fertilizer treatments increased the stalk yield but not the percent of leaves and tops in the total biomass.

The total biomass yield which included the stalks, leaves and tops was higher in M81E (21.7 T/A) than in Wray (18.8 T/A) and Cowley (19.6 T/A). The biomass yield was increased with N applications of 90 lbs./A and of 180 lbs./A over the lower rate.

The application of 80 and 160 lbs./A of potash did not significantly affect the yield of each biomass component.

Sugar and alcohol yield. The sugar and alcohol yield data obtained in the St. Gabirel test are reported for individual treatments and factorial mean effect in Table 3. The brix, sucrose and total sugars in the sorghum juice are expressed as percent of stalk weight and not as percent of extracted juice. The percent brix or sugar solids in Wray and Cowley was similiar and higher than in M81E. The percent sucrose and total sugars were lowest in M81E and highest in Wray. However, due to the higher stalk yield with M81E, the total sugar and alcohol yield per acre were not significantly different among varieties.

Each fertilizer treatment applied produced significantly more percent brix, sucrose and total sugar than the check plot. The total sugar and alcohol yield per acre was increased with N applications of 90 lbs./A and with 180 lbs./A over the lower rate. The potash treatments did not increase the yield of each sugar yield component.

Iberia Test

The varieties planted in this test were Wray, Keller, Theis, M81E, Mer. 76-6 and Cowley. Two methods of N fertilizer application were tested with each variety. One method consisted of bedding 150 pounds/A of N in the rows prior to planting and the other consisted of top-dressing 150 pounds/A of N when the plants were about 12 inches tall.

The sorghum planting was delayed until late May due to wet field conditions. Therefore, the plant growth and yields were not typical for this location and the results are not reported.

Table 1. Effect of varieties and rates of fertilizer on the biomass yield of sweet sorghum at maturity on a Commerce silt loam soil on the St. Gabriel Research Station, 1987.

Sweet Sorghum Variety	Fertilizer $N-P_2O_5-K_2O$ lbs./A	Stalk No. 1000/A	Stalk Wt. lbs.	Stalk fiber %	Stalk fiber T/A	Stalk yield %	Stalk yield T/A	Leaves yield %	Leaves yield T/A	Tops yield %	Tops yield T/A	Total yield T/A
Wray	0-0-0	25.9	0.50	13.7	1.1	76.5	8.1	19.0	2.0	4.5	0.4	10.5
	90-0-0	32.5	0.89	13.9	2.1	78.5	15.0	17.4	3.3	4.1	0.8	19.1
	180-0-0	36.7	1.12	14.4	2.6	79.9	18.0	16.5	3.7	3.6	0.8	22.5
	180-0-80	31.4	1.13	14.1	2.3	80.2	16.8	16.3	3.4	3.6	0.7	20.9
	180-0-160	31.6	1.32	13.7	2.4	82.2	17.3	14.5	3.0	3.3	0.7	21.0
M81E	0-0-0	26.6	0.60	16.4	1.4	77.8	8.2	17.7	1.9	4.5	0.5	10.5
	90-0-0	30.9	1.24	15.9	2.6	78.9	16.4	15.6	3.2	5.5	1.2	20.8
	180-0-0	33.1	1.35	16.8	3.5	77.9	20.7	15.9	4.2	6.2	1.6	26.6
	180-0-80	28.5	1.31	17.1	3.3	77.8	19.4	18.8	4.7	3.4	0.8	24.9
	180-0-160	32.3	1.39	16.2	3.4	79.7	20.7	16.4	4.2	3.9	1.0	25.9
Cowley	0-0-0	22.7	0.49	16.2	1.0	72.7	5.9	21.6	1.7	5.7	0.5	8.0
	90-0-0	32.6	1.09	17.2	2.2	74.5	12.7	19.6	3.3	5.9	1.0	17.1
	180-0-0	34.1	1.15	17.8	3.1	72.3	17.0	21.7	5.1	6.0	1.4	23.6
	180-0-80	32.2	1.24	16.8	3.0	74.1	18.1	20.2	5.0	5.7	1.4	24.6
	180-0-160	35.0	1.13	16.0	2.9	72.2	17.9	22.6	5.6	5.2	1.3	24.9
HSD .05		6.9	0.53	2.0	0.6	6.9	3.9	5.4	1.2	NS	0.7	4.6

Table 2. Mean effect of varieties and fertilizers on biomass yield of sweet sorghum on Commerce silt loam soil, 1987.

Sweet Sorghum Variety	Fertilizer $N-P_2O_5-K_2O$ lbs./A	Stalk No. 1000/A	Stalk Wt. lbs.	Stalk fiber %	Stalk fiber T/A	Stalk yield %	Stalk yield T/A	Leaves yield %	Leaves yield T/A	Tops yield %	Tops yield T/A	Total yield T/A
Wray		31.6	0.99	14.0	2.1	79.5	15.0	16.7	3.1	3.8	0.7	18.8
81E		30.3	1.18	16.5	2.8	78.4	17.1	16.9	3.6	4.7	1.0	21.7
Cowley		31.3	1.02	16.8	2.4	73.1	14.3	21.2	4.2	5.7	1.1	19.6
	0-0-0	25.1	0.53	15.4	1.1	75.7	7.4	19.4	1.8	4.9	0.5	9.7
	90-0-0	32.0	1.07	15.7	2.3	77.3	14.7	17.5	3.3	5.2	1.0	19.0
	180-0-0	34.6	1.21	16.3	3.1	76.7	18.6	18.0	4.4	5.3	1.3	24.2
	180-0-80	30.7	1.23	16.0	2.9	77.3	18.1	18.4	4.4	4.2	1.0	23.5
	180-0-160	33.0	1.28	15.3	2.9	78.0	18.6	17.8	4.3	4.2	1.0	23.9
HSD .05	Variety	NS	0.16	0.6	0.2	2.1	1.2	1.6	0.4	1.0	0.2	1.4
HSD .05	Fertilizer	3.1	0.24	0.9	0.3	NS	1.8	NS	0.6	NS	0.3	2.1

Table 3. Effect of varieties and rates of fertilizer on the sugar and alcohol sugar and alcohol yield of sweet sorghum on a Commerce silt loam soil on the St. Gabriel Research Station, 1987.

Sweet Sorghum Variety	Fertilizer $N-P_2O_5-K_2O$ lbs./A	Sugar yield in stalks at maturity					Alcohol yield gal./A
		Brix %	Sucrose %	Sucrose lbs./A	Total sugars %	Total sugars lbs./A	
Wray	0-0-0	16.7	14.0	2309	16.1	2639	185
	90-0-0	18.2	15.3	4595	17.5	5245	367
	180-0-0	18.1	15.2	5468	17.4	6254	438
	180-0-80	18.0	15.2	5090	17.4	5843	409
	180-0-160	18.0	15.0	5200	17.3	5980	419
M81E	0-0-0	13.9	10.5	1731	13.4	2198	153
	90-0-0	14.7	11.2	3684	14.2	4654	326
	180-0-0	15.3	12.2	4721	14.8	5738	402
	180-0-160	14.8	11.1	4604	14.2	5873	411
Cowley	0-0-0	15.7	13.4	1594	15.1	1802	126
	90-0-0	17.7	14.3	3625	17.0	4333	303
	180-0-0	17.7	13.7	4673	17.1	5849	409
	180-0-80	18.0	14.6	5299	17.3	6289	440
	180-0-160	18.1	15.0	5389	17.4	6242	437
HSD .05		1.7	2.2	1234	1.7	1419	99
		Factorial mean effect					
Wray		17.8	14.9	4533	17.1	5192	363
M81E		14.8	11.4	3923	14.2	4895	343
Cowley		17.4	14.2	4116	16.8	4903	343
	0-0-0	15.4	12.6	1878	14.8	2213	155
	90-0-0	16.9	13.6	3968	16.2	4744	332
	180-0-0	17.0	13.6	5005	16.3	6038	423
	180-0-80	17.1	14.0	5037	16.5	5957	417
	180-0-160	16.9	13.7	5064	16.3	6032	422
HSD .05	Variety	0.5	0.6	368	0.5	NS	NS
HSD .05	Fertilizer	0.8	1.0	560	0.6	643	45

Sugar content expressed as percent of stalk weight.

Management Strategies for a Wheat - Sugarcane Rotation System in Louisiana

S. A. Harrison and Ray Ricaud
Agronomy Department

Sugarcane is normally grown on wide, elevated rows in Louisiana to facilitate proper surface drainage of heavy soils. After three years in a sugarcane production system the land is either fallowed for a year or an alternative crop is grown. This rotation allows disease suppression, weed control, and other benefits to the subsequent sugarcane crop. Wheat fits into this rotation scheme better than summer crops, and offers the added benefits of improved labor and equipment utilization, erosion control, and increased income and cash flow.

Wheat does not grow well on poorly drained soils due to decreased nitrogen availability, poor oxygenation around the roots, and the increase of pathogens. Such plants are normally stunted and low-yielding. Leaving the raised or partially raised sugarcane beds should improve drainage and increase plant vigor during a wheat rotation. In addition, the sugarcane stubble may prevent proper seedbed preparation and planting when a flat-plow tillage system is followed. Leaving the raised beds and planting only the raised areas of these beds will prevent such problems.

The objectives of this study were: (1) to determine the effect of raised beds on wheat production in a sugarcane rotation system and (2) to determine the optimum combination of nitrogen rate, fungicide application, planting method, and other wheat production parameters in a sugarcane - wheat rotation system.

MATERIALS AND METHODS:

The experiment was planted on 11-4-1987 at the St. Gabriel Research Station, following harvest of the sugarcane crop. The experimental treatments were composed of 24 combinations of bed type, planting method (broadcast vs drill), cultivar type, fungicide level, and growth regulator arranged in four replications of a randomized complete block design. The cultivar comparison was a hybrid versus a pureline variety. The effects of intensive and conventional management were examined for each cultivar. Intensive management included two 70-pound applications of N, the use of a fungicide (Tilt®), and the use of a growth regulator (Cerone®) to reduce lodging. The conventional management plots received only 70 pounds of N and were not sprayed with Tilt or Cerone. Grain yield, disease incidence, vigor, stand density and lodging were determined for each plot.

RESULTS AND DISCUSSION:

The low-profile sugarcane rows appeared to have much better drainage and resulted in higher grain yields (Table 1). Plots planted on low-profile beds produced significantly better stands and vigor than wheat planted on a flat bed. Drilling was the superior method of planting. Intensive management (extra N and fungicide application) increased yields by 10.5 bushels/acre, which may not have been cost effective. The hybrid did not yield significantly better than the variety and did not justify the extra cost of hybrid seed. The growth regulator (Cerone) decreased lodging, but the shorter

plant was a better host for leaf rust and had a significantly higher incidence. Cerone did not increase yield. The study is being repeated during the 1988-89 wheat season. The effects of wheat versus fallow on subsequent sugarcane production and weed control will also be evaluated.

Table 1. Effect of management procedure on yield and agronomic traits† of wheat in a sugarcane rotation program.

Treatment	Yield	Stand	Vigor	Leaf rust	Lodging
	bu/acre	score	rating	%	score
Lowprofile	50.1*	4.9*	4.2*	8	2.4
Flat Bed	26.7	8.2	5.8	5	2.4
Drill	43.2*	4.6*	5.2	7	1.8*
Broadcast	34.5	5.4	4.8	6	3.0
Conventional	31.8*	5.2	5.4	7	2.6
Itensive	42.2	4.9	4.8	6	2.3
Hybrid	40.3	4.8	5.0	5*	2.2*
Variety	37.1	5.2	5.0	8	2.6
Cerone	39.4	5.2	5.2	8*	2.0*
No Cerone	38.5	4.9	4.9	5	2.6

† All values for a triat are averaged across all other levels of the other variables.
Stand and vigor rated as seedlings with 1=best; 9=worst.
Lodging rated on a scale of 1-5, 1=best.
* = significantly different results in a paired comparison at the 5% level of probability.

Alternate Host Crop and Cultural Practice Studies with Sugarcane Insects

T. E. Reagan and B. W. Fuller

Portion of Annual Report LAES Project LA 2013

Economic impact studies revealed that the sugarcane borer, Diatraea saccharalis (F.), reduced sweet sorghum yield of total sugars up to 46% in artificially infested field trials. A significant relationship was found between D. saccharalis damage and yield loss that indicated an economic injury level of 10% bored internodes. Stalk weight, percent sucrose, and total sugars were negatively correlated to D. saccharalis damage; and increased fiber content was positively correlated to percent bored internodes. Information from damage levels, along with survival records, indicated that the economic threshold was reached when approximately 5% of the sweet sorghum plants contained small D. saccharalis larvae in their leafsheaths.

Comparisons of the predator-prey relationship between sweet sorghum and sugarcane plots revealed that the arthropod predator composition was similar for both crops, but predator abundance in sugarcane was 4- and 16-fold greater than that found in sweet sorghum during 1985 and 1986, respectively. Predator habitat disruption associated with cultivation practices in sweet sorghum and sugarcane is important in this relationship. The red imported fire ant, Solenopsis invicta Buren, was the dominant arthropod predator found in pitfall traps and canopy samples of each crop. Based upon pitfall trap determinations, carabid larvae, cicindelids, and the Araneae were significantly more abundant predators in sweet sorghum as compared with sugarcane. Also populations of carabid larvae, chrysopids and Orius spp. were significantly greater in sweet sorghum canopy samples. Reduced damage by D. saccharalis in plots without predator suppression resulted in 22.4 and 18.6% greater yield of total sugars in sweet sorghum and sugarcane, respectively. Compared with sugarcane 'CP74-383', D. saccharalis larval survival inside stalk tunnels was significantly greater in sweet sorghum 'Wray' during 1985. Predators reduced D. saccharalis moth emergence in both crops by approximately 50% in 1986.

A two year study was conducted to evaluate the effects of sweet sorghum stalk barrel diameter and fiber content on D. saccharalis populations. Larval survival and moth emergence were not significantly affected by the resultant increased fiber content that accompanied decreased stalk barrel diameter.

Percent D. saccharalis-bored internodes, larval survival, and total moth emergence x 10^3/ha determined from harvest records for sweet sorghum and sugarcane, Iberville Parish, La., 1985-86.

Crop & treatment	% bored internodes		% larval survival after entry		Adult emergence (thousands/ha)	
	1985	1986	1985	1986	1985	1986
Sugarcane						
No chlordane	22.2b	10.5b	4.9a	1.7b	10.3a	21.6b
Chlordane	28.3a	35.6a	3.8a	10.4a	18.1a	43.1a
Sweet sorghum						
No chlordane	4.0a	8.6b	22.2b	10.8a	9.3a	11.2b
Chlordane	6.9a	16.0a	24.1a	13.8a	13.0a	25.3a

Means in columns within crops followed by the same letter are not significantly different (P>0.05) by the F statistic.

Interdisciplinary Studies with Sugarcane Insects

T. E. Reagan and A. T. Showler

Portion of Annual Report LAES Project LA 2013

Interactions among Louisiana sugarcane (Saccharum hybrids), weeds, nematodes, sugarcane mosaic virus (SCMV), and pest, prey, and predatory arthropods were mediated through trophic, host plant biochemical, and intra- and interspecific competitive relationships. Weed competition reduced crop biomass (15%, P≦0.01), stand density (18%, P≦0.005), and sugar yield (13%, P≦0.05). Certain weeds, however, were associated with more predatory arthropods, including fire ants, Solenopsis invicta Buren, on the soil, weeds, and sugarcane plants, and with a 25% (P≦0.05) reduction of the sugarcane borer, Diatraea saccharalis (F.). Aldicarb (Temik®), a nematicide- insecticide, diminished many phytophagous nematodes during the growing season, and reduced stalk-associated predators; thus, borer injury increased by 19% (P≦0.05). Fenvalerate (Pydrin®), a pyrethroid insecticide, providing good borer control, reduced prey and predatory arthropods and increased yellow sugarcane aphid, Sipha flava (Forbes), infestations (63%, P≦0.0001). Control of both weed and sugarcane borer pressures was the most profitable pest management strategy.

Build-up of the yellow sugarcane aphid (mean/leaf) following aerial applications of pyrethroid insecticides, Lanaux Plantation, Kilona, LA 1987.

Weeks after application	Check	Guthion 0.75 lb ai/A	Pydrin 0.14 lb ai/A	Baythroid 0.033 lb ai/A	Pydrin & Penetrator	Cymbush 0.045 lb ai/A
4 (1st appl)	20	17	56	40	47	76
1 (2nd appl)	48	20	136	126	90	129
2 (2nd appl)	16	35	116	81	49	78
3 (2nd appl)	8	20	78	92	72	50
4 (2nd appl)	3	4	15	14	24	22

P<0.05 Pyrethroids vs. Guthion or Check; Appl dates July 15 and Aug. 17.

Weeds were associated with low nematode infestations and, except for Criconemella spp., failed to reservoir phytophagous nematodes. Fifteen of 17 sugarcane free amino acids (FAAs) were lower (P≦0.05) where weed competition occurred. Nematode-induced stress was associated with the reduction of four FAAs (P≦0.005), and SCMV was related to other FAA changes. A weed-virus interaction (P≦0.001) for free cysteine was correlated (r=0.59, P≦0.001) with Tylenchorhynchus annulatus infestations. Population trends of various nematode groups were also associated with virus, weed, and nematode stress-related FAA changes. Changes in sugarcane FAA accumulations may influence levels of other phytophagous pests, including nematodes.

Ecological interactions of fire ants in North America, and the versatility of radiotracer methods for studying insect ecology and ethology were also reviewed. Using radiotracers Zn-65 and Mn-54 to label two adjacent S. invicta colonies, the observation of daily territorial changes offered a unique perspective in association with environmental changes (including flooding) and colony behavior such as nest relocation. Utilizing instrumental neutron activation analysis and the tagging of S. invicta colonies with samarium, a rare earth element, revealed a 28% ($P \leq 0.02$) decrease in the size of S. invicta foraging areas due to a greater food availability in weedy as compared to weed-free habitats. S. invicta foraging activity was negatively correlated ($r=0.69$) with that of Paratrechina vividula, one of two other ant species encountered.

Sugarcane Borer Fecundity

T. E. Reagan and Ricardo Bessin

Portion of Annual Report LAES Project LA 2013

Sugarcane borer pupae were collected from two varieties of sugarcane, 'CP61-37' (susceptible) and 'CP65-357' (moderately resistant), hybird corn 'Merrit', and johnsongrass on the St. Gabriel research station during the period from 20 August through 20 September during 1987. This corresponded to the peak D. saccharalis natural infestation. Plants from untreated fields were examined for characteristic D. saccharalis exit holes and the pupae were carefully excised from the stalks. Data collection included pupal weights, lengths, and diameters (at the first abdominal segment), eggs layed per female, and sex of the pupae from the different hosts.

During the one month period of collection, a total of 254 pupae were obtained from the four hosts. The sex ratio of collected pupae approximated a 1:1 relationship for all hosts. Biometric parameter estimates of D. saccharalis populations from the different hosts are presented in Table 1. When analyzed seperately by sex, pupae from the four hosts displayed significant differences in weight, length, and diameter. Pupae from Johnsongrass were smaller in all measured parameters than those from other hosts. Differences were not detected in size or weight of pupae collected from susceptible sugarcane, 'CP61-37', and corn, however, these pupae were heavier than those from other hosts.

The maximun number of eggs produced by a female was 1141, and was collected from sugarcane variety 'CP61-37'. Females from corn and 'CP61-37' averaged laying 668 and 634 eggs, respectively, which was more than from other hosts (Table 2). Sugarcane borer pupae taken from Johnsongrass yielded only 431 eggs per female, the least from any host. Analysis of covariance performed on fecundity utilized host as a covariable and regressed fecundity on pupal weight, length, and diameter. The best regression model was a simple linear relationship incorporating only the independent variable weight.

No. eggs = -9.11 + 4.49*Weight(in mg)

After pupal weight was accounted for there was no improvement in the model by the addition of the covariable, host. The host plant, therefore, was unimportant in predicting egg production after the pupal weight had been taken into account. The model to predict D. saccharalis fecundity on pupal weight accounted for 63% of the variation in egg production.

Corn and the susceptible sugarcane variety, 'CP61-37', were shown to be the most optimal hosts for D. saccharalis in this study. Heavier pupal weight resulted from these hosts, which in turn led to a greater production of eggs per female. Johnsongrass though only considered a

minor host of D. sacharalis in sugarcane production areas yielded more than one hundred pupae for this study, though those collected were smaller, lighter, and produced fewer eggs.

Table 1. Comparison of lengths, diameters, and weigths of sugarcane borer pupae collected from four gramineous hosts.

	Female				Male			
Host	No.	Weight (mg)[a]	Length (cm)	Diam (cm)	No.	Weight (mg)	Length (cm)	Diam (cm)
Corn	18	144.4a	1.75a	0.37a	21	94.5a	1.52a	0.33a
CP61-37[b]	27	143.3a	1.71ab	0.37a	17	92.0a	1.50ab	0.32a
CP65-357[c]	30	127.0b	1.65b	0.36a	38	78.1b	1.44b	0.30b
Johnson-grass	43	97.2c	1.54c	0.32b	60	60.9c	1.33c	0.28c

[a]Means in the same column followed by the same letter are not significantly different (DMRT P > 0.05).
[b]A sugarcane borer susceptible sugarcane variety.
[c]A sugarcane variety moderately resistant to the sugarcane borer.

Table 2. Comparison of the mean fecundity of D. saccharalis collected from 4 gramineous hosts.

Host	No.	Eggs/Female[a]
Corn	10	668 a
CP61-37	17	634 a
CP65-357	19	520 b
Johnsongrass	31	431 c

[a]Means in the same column followed by the same letter are not significantly different (DMRT P > 0.05).

Sugarcane Borer Alternate Hosts

A survey of weeds was conducted on the St. Gabriel Research Station in order to indentify alternative SCB hosts which occur in the sugarcane agroecosystem. SCB pupae were collected from seven grasses--Johnsongrass, Sorghum halepense (L.) Person; sprangletop, Leptochloa filiformis (Lam.) Beauvios; dallisgrass, Paspalum dilatatum Poiret; hairy crabgrass, Digitaria sanguinalis (L.) Koeler; goosegrass, Eleusine indica (L.) Gaertner; junglerice, Echinochloa colonum (L.) Link; and annual ryegrass, Lolium temulentum L.

Varietal Resistance to *Diatraea saccharalis*.

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Portion of Annual Report LAES Project LA2657 and LA2013

Resistance to *D. saccharalis* damage in sugarcane can be categorized predominately as antibiosis. Physical characteristics of the plant, such as leaf-sheath appression and rapid rind hardness development contribute to the differential survival of the young larvae among cultivars. The use of percent bored internodes ranks sugarcane cultivars on observed external evidence of *D. saccharalis* tunneling into the stalk. However, the degree of internal damage to the plant and the ultimate survival of *D. saccharalis* larvae are not addressed with this index. Varietal resistance to the latter stages of the *D. saccharalis* life cycle have been investigated in this study. Although advancement of cultivars that are less likely to be damaged by *D. saccharalis* should be a primary goal of the breeding program, resistance that reducess overall pest populations should also be investigated.

The CP85 series (12 cultivars) was planted in a four-replicated latice design on the Lanaux Plantation, near Edgard, LA. Four commercial cultivars were included in this study, CP70-321, CP65-357, CP61-37, and CP74-383, which respectively corresponded to SCB resistant, moderately resistant, and two susceptible cultivars. At harvest, one-15 stalk sample was evaluated from each 10 foot plot for damage (% bored internodes) and relative survival of in the stalk (ratio of exit holes to bored internodes).

SCB varietal resistance evaluations revealed that three cultivars exhibited less damage than that sustained by the resistant cultivar CP70-321, and ten cultivars had lower levels of larvae surviving inside the stalk than the relative survival on CP70-321 (Table 1). Although CP70-321 resists penetration of *D. saccharalis* into the stalk, upon entry the larvae appear to survive better than in most of the other cultivars used in this study. Another commercial cultivar, CP74-357 (susceptible), ranked thirteenth out of sixteen when using external damage as the ranking criteria. However, when relative survival is the criteria for ranking this cultivar it is ranked third relative to the other cultivars. When analyzed by plots, the relationship between percent bored internodes and relative survival resulted in a correlation coefficient value of 0.253 ($P=0.0553$). Thus, resistance rating based on external evidence of *D. saccharalis* entry into the stalk does not accurately represent the degree of resistance acting upon larvae in the stalk.

Relative to this insect pest in sugarcane, a grower's primary objective is to minimize economic impact. There are two approaches to reduce the economic impact of pests. The first is to minimize damage caused by the pest and the second approach is to minimize the overall cost incurred controlling the pest. Use of resistant sugarcane cultivars reduces pest damage at little or no cost to the grower. Current *D. saccharalis* resistance rating schemes are focused at the prevention of damage, whereas in this study an additional criteria is

proposed. Incorporating the cultivars' pest survival rating allows for indentification of cultivars which enhance D. saccharalis populations and involves little additional data collection; and enhances the efficiency and value of the entomological component in the sugarcane varietal breeding and development program.

Table 1. Diatraea saccharalis damage and relative survival inside the stalk in four commercial and 12 experimental cultivars (1985 series) during 1987 on the Lanaux Plantation, near Edgard, LA.

Cultivar	% Bored Internodes[1/]	Relative Survival[2/]	Rank Based on % Bored Internodes	Rank Based on Relative Survival
CP61-37	39.95 bcde	0.582 a	10	16
CP85-298	44.94 bc	0.439 abc	14	14
CP85-307	41.80 bcd	0.371 bcd	12	10
CP85-313	36.30 cdef	0.354 cd	9	8
CP85-316	41.17 bcd	0.422 abcd	11	12
CP70-321	26.21 fgh	0.397 bcd	4	11
CP85-336	30.98 efg	0.339 cd	6	6
CP85-341	19.34 h	0.190 ef	1	2
CP85-352	30.78 efg	0.330 cd	5	7
CP65-357	33.12 defg	0.285 de	7	4
CP85-358	24.68 gh	0.370 cd	2	9
CP85-360	57.31 a	0.425 abc	16	13
CP85-373	28.16 defg	0.332 cd	8	5
CP85-376	25.73 gh	0.156 f	3	1
CP74-383	41.25 cd	0.271 de	13	3
CP85-384	47.36 b	0.502 ab	15	15

1/ Means within the same column followed by the same letter are not significantly different, DMRT P>0.05.

2/ Based on a ratio of D. saccharalis exit holes to bored internodes.

Sugarcane Smut and Pythium Root Rot Research

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Smut Spread and Increase Studies:

The pattern of spread and rate of increase of smut were studied in fields of naturally-infected sugarcane over a 4-yr-period. Stools showing smut whips were counted and mapped during plant cane and subsequent stubble crops in fields of CP 65-357, CP 74-383 and CP 76-331. Smut incidence increased in stubble crops in some years but decreased in others (see Table 1). New smut infections occurred in first stubble at distances of up to 35-55 ft. from a plant cane infection. Most new infections occurred within 20 ft. of an inoculum source. The rate of disease increase was affected by an interaction of variety infection characteristics and environmental factors. Mild winters and normal to wet growing seasons favored disease increase; however, high rates of disease increase were not observed. These results suggest that if the initial level of disease can be kept low, then moderately susceptible varieties may be grown without suffering significant losses to smut. This research was conducted cooperatively with Dr. M. P. Grisham, USDA/ARS Sugarcane Research Unit, Houma.

Smut Resistance Studies:

Inoculation trials to evaluate smut resistance levels in variety candidates are conducted annually as part of the Louisiana Cooperative Sugarcane Breeding Program. During 1987, 7 of 95 (7%) 1980-1984 series selections, 5 of 43 (12%) 1985 series and 6 of 76 (8%) 1986 series selections were determined to be highly susceptible to smut. The selections will be evaluated again in first stubble during 1988.

A quantitative inheritance study to determine the heritability of smut resistance in the Louisiana sugarcane breeding population was completed during 1987. Smut resistance was studied in parents and 10 progeny of 18 crosses, and resistance was found to be a moderately heritable trait. Narrow sense heritability estimates of 0.41 and 0.38 were obtained for plant cane and first stubble crops, respectively. Estimates of smut reaction repeatability were 0.60 for parent varieties in two plant cane crops and 0.78 and 0.62 for parents and progeny, respectively, from plant cane to first stubble. Five of 17 parents showed significant changes in smut reaction between two plant cane crops and from plant cane to first stubble. In additional experiments, initial shoots of two varieties, CP 65-357 and CP 74-383, were found to become resistant to infection at shoot lengths greater than 4.5 inches, and evidence was obtained suggesting that post-infection resistance, limiting the extent of disease development within plants, is an important aspect of resistance to smut in Louisiana varieties.

Studies on the Role of Pythium Root Rot in Stubble Decline:

Different assay techniques are being used to determine and compare Pythium arrhenomanes population levels in fields in different stages of the crop cycle and through the course of the growing season. In addition, isolates of P. arrhenomanes and different Pythium species are being compared by protein electrophoresis.

The first 3-year field test of the fungicide, metalaxyl, was completed during 1987. Significant stubble yield increases resulted from metalaxyl treatments in CP 70-321 and CP 70-330. The total 3-year crop yield was increased 16% for CP 70-321 and 27% for CP 70-330. The second stubble yields in treated plots of both varieties were comparable to plant cane yields, and economic third stubble crops should be obtained. In comparison, second stubble yields of nontreated plots were 30% lower than plant cane yields for both varieties, and both would probably be plowed out. Results from additional field metalaxyl tests in progress have been very inconsistent. Significant yield increases have been obtained in some tests, whereas in other tests, metalaxyl treatments have not increased yields. Research is in progress to determine when severe root rot is occurring and what rates and times of metalaxyl application will result in consistent yield increases.

TABLE 1. Change in number of smut-infected stools from plant cane (PC) through first stubble (FS) and second stubble (SS) determined in three sugarcane varieties over a four-year-period.

Sugarcane variety	PC Year	Number of PC stools with smut[a]	FS stools with smut			SS stools with smut
			Recurrent smut[b]	New FS infections	Total stools	
CP 65-357	1984	57	10	45	55	---
CP 65-357	1985	55	30	279	309	281
CP 74-383	1985	69	14	147	161	124
CP 76-331	1986	88	66	167	233	---

[a]Smut infection determined from observation of at least one stalk in a sugarcane stool showing a smut whip.

[b]Number of FR sugarcane stools showing smut whips which had previously shown smut whips in PC.

The Genetic Variance-Covariance Structure of the Louisiana Sugarcane Breeding Population.1/

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Genetic variances estimates were obtained for ten traits of the Louisiana sugarcane breeding population. The variances and resulting statistics were derived from a population of three offspring each from 40 biparental crosses of 28 elite parents. The offspring and their parents were grown in replicated tests in five environments (year-location combinations). Narrow and broad-sense heritabilities, genetic correlations, genetic coefficients of variation and genetic gain estimates were estimated. To represent clonal populations in different stages of selection, the population was divided into three subpopulations: offspring, noncommercial parents and commercial parents. For each subpopulation, the genotype x environment (GE) variation was partitioned into genotype x year, genotype x location and genotype x year x location components. Genotypic and phenotypic path analyses were also performed for each population for sucrose yield, cane yield, sucrose concentration and stalk weight.

Nonadditive genetic variance predominately determined genotype. The results suggested the most effective cross performance prediction would be derived from the progeny performance of specific biparental crosses.

Genetic variances diminished with selection. GE variance and its relative importance to genetic variance estimates fluctuated with the trait and population but at times was substantial. It was suggested selection for increased genotypic stability, in the sense of reduced GE variances, would be not effective without better delineation of the specific environments interacting with specific genotypes. Broad-sense and phenotypic correlations were generally concordant and positive. In several circumstances additive genetic correlations were stronger and occasionally of different sign than the broad-sense genetic and phenotypic correlations. It was hypothesized that the disparity between correlation estimates likely resulted from use of nonrandomly mated elite parents. Although estimation assumptions were not classically upheld, the relationships were between relatives of interest and of populations specific to the sugarcane breeding program. Cane yield was the major determining influence on sucrose yield and was not affected by population. The relationship among stalk weight, stalk diameter, stalk number and stalk density strengthened with selection and in one case turned negative in sign.

1/The support of graduate training in sugarcane genetics by the American Sugar Cane League is gratefully acknowledged.

Sugarcane Flowering and Crossing

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One hundred eighty varieties of sugarcane were used in the 1987 crossing campaign. There were 23 "L" varieties, 60 "LCP" varieties, 86 "CP" varieties selected for Louisiana, 8 "CP" varieties selected for Florida, and 3 "US" varieties. Fifty five varieties were of unknown photoperiod response.

The 55 varieties of unknown photoperiod response along with 20 selected varieties of known photoperiod response were placed on the greenhouse rail system for natural induction. By comparing the date of flowering of the new varieties with that of older varieties, a first approximation of the photoperiod response of the new varieties was made. The pollen producing capacity of each new variety that flowered after natural induction was also estimated.

Two photoperiod experiments were conducted in 1987 within three of the six available photoperiod bays. Seventeen varieties of known photoperiod response were subjected to two photoperiod regimes and two different lengths of induction cycles (constant photoperiod). Each bay contained identical material and the varieties within each bay were divided into three categories based on their ease of flower induction. Each category was placed on one of the three rail carts assigned to each bay.

Sunlight was the sole light source for the 1987 photoperiod treatments, which began on June 10. The doors of the photoperiod bays were opened at the prescribed time to start the photoperiod treatments and the carts were pulled from the photoperiod houses. The natural sunset terminated the photoperiod for each day. The carts were pushed into the photoperiod houses after sunset. Bays 1 and 2 received induction cycles of 12 hours and 30 minutes, whereas Bay 3 received induction cycles of 12 hours. The number of induction cycles required to initiate flowering, calculated from data gathered from previous crossing seasons, was used to determined the day the photoperiod treatment for a particular variety was to begin.

The decreasing of photoperiod for the three bays commenced on July 12. The photoperiods of Bays 1 and 3 were decreased at a rate of 1/2 minute per day, while the photoperiod of Bay 2 was decreased at the rate of one minute per day. Results from photoperiod experiments in 1986 suggested that Bay 1, decreasing at a rate of 1/2 minute per day, would flower later than Bay 2. In an effort to synchronize flowering, the decreasing of photoperiod for Bay 2 commenced on July 19. On September 12, photoperiod treatments were ceased and the canes were again subjected to natural photoperiod. Data collected from the experiment consisted of the date flowers began to dehisce and the pollen production rating.

In 1986, successful synchronization of flowering resulted in a larger number of tassels being available for crossing than could be accommodated in the crossing greenhouse. In 1987, an effort was made to split the season into two flowering peaks. The early to medium flowering varieties in Bays 1, 2, and 3, were targeted to begin flowering on September 28. The early, medium, and late flowering varieties in Bays 4, 5, and 6, were targeted to begin flowering on October 28.

One hundred five varieties of known photoperiod response were placed on the nine rail carts of bays 4, 5, and 6 according to their ease of photoperiod flower induction. The decrease in photoperiod began on August 15 at a rate of one minute per day. Photoperiod treatments were stopped on September 12 and the canes were subjected to natural photoperiod. All plants designated for pollen production were protected when night temperatures fell below 70 degrees Farenheit.

Synchronization of tasseling was excellent in the photoperiod experiment with the exception of Bay 3, which showed very little photoperiodic induction. Bays 5 and 6, which were not protected during the cool nights in October and November for sterilization purposes, lagged behind Bay 4 in tasseling. Data regarding varietal response to the photoperiod treatments (i.e. Days to first flower) are presented in Table 1. The first cross from the photoperiod bays was made on September 20.

The first cross from the greenhouse rail system was made on December 7 and flowering of the material on this system continued into the month of January. At the end of the crossing campaign, all varieties that had not flowered were examined to determine if induction had taken place. Data regarding the flowering type of the varieties on the greenhouse system are presented in Table 2.

Three hundred sixty crosses were made during the 1987 crossing campaign (Table 3). The majority of these crosses were biparental. Of the 238,263 viable seed produced in 1987, 199,372 were from the biparental crosses. Sixteen polycrosses yielded 19,237 viable seed and 19,654 viable seed were generated via self pollenation of the 81 varieties used as male parents. Additional details regarding the 1987 photoperiod and crossing campaign are available upon request.

Table 1. Response of sugarcane varieties to 1987 photoperiod treatments.

Variety	Days to first flower 1/					
	Bay 1	Bay 2	Bay 3	Bay 4	Bay 5	Bay 6
CP48-103	97	104	700	.	128	.
CP52-068	102	.	450	.	144	.
CP55-038	116	.	.	117	.	.
CP57-614	93	82	72	.	.	.
CP61-037	124	107	700	.	.	148
CP62-258	.	93	.	.	.	.
CP65-357	115	99	174	.	154	.
CP67-412	114	105	.	121	.	145
CP69-1052	.	.	.	500	.	.
CP69-373	.	.	153	.	.	.
CP70-300	113	99	146	.	135	.
CP70-321	108	101	150	.	147	.
CP70-330	124	105	138	.	.	151
CP71-357	.	.	.	.	.	169
CP71-441	.	.	.	450	.	.
CP71-459	.	.	.	102	.	.
CP72-1210	118	100	.	.	.	.
CP72-1312	.	.	700	.	.	.
CP72-2086	.	.	.	700	.	.
CP72-355	111	.	.	.	.	.
CP72-370	110	103	700	119	.	151
CP73-340	.	.	.	121	.	.
CP73-343	114	103	700	121	.	.
CP73-345	.	99	.	.	125	.
CP73-351	.	.	.	139	.	.
CP74-1094	.	.	.	132	.	.
CP74-2013	.	.	500	.	.	.
CP74-328	.	.	700	.	.	.
CP74-383	93	83	153	.	125	.
CP75-1082	93	.	.	111	.	.
CP75-1091	102	.	.	.	.	.
CP75-308	.	.	.	.	.	146
CP75-327	.	90	.	.	144	.
CP75-361	.	103	700	.	500	.
CP76-331	.	.	90	104	.	.
CP77-310	.	.	.	104	.	.
CP77-402	106	.	.	109	.	.
CP77-405	.	96	.	.	118	.
CP77-407	.	.	.	109	.	.
CP77-410	.	72	.	.	.	.
CP77-414	.	.	700	.	.	131
CP78-317	93	81	88	.	.	.
CP78-357	.	.	700	.	500	.
CP79-318	115	99	97	.	142	.
CP79-332	.	.	.	.	.	153
CP79-348	109	102	700	.	144	.
CP80-313	113	97	101	.	139	.
CP80-323	.	.	.	122	.	120
CP80-328	.	94	.	.	.	.
CP80-329	.	105	.	.	.	.
CP80-352	.	86	.	.	.	.
CP80-356	.	.	.	.	.	159
CP81-304	.	.	.	.	.	700
CP81-307	.	.	.	.	500	.
CP81-325	.	.	149	.	153	.
CP81-329	.	.	.	.	.	190
CP81-332	113	.	.	.	139	.
CP82-513	.	.	.	.	.	143
CP82-519	.	.	.	.	.	127
CP82-520	123	.	.	.	.	.
CP82-537	.	.	.	161	.	169
CP82-547	700	700	.	.	.	400
CP82-550	114	107	.	.	145	.
CP82-551	.	.	.	.	.	500

Table 1. continued.

CP83-606	128	.	.	.	500	.
CP83-607	.	.	.	.	128	.
CP83-625	.	.	.	.	.	132
CP83-631	.	.	.	.	.	146
CP83-632	.	.	.	.	.	166
CP83-637	.	.	.	.	.	500
CP83-644	.	.	.	.	165	.
CP83-649	.	.	.	.	.	500
CP83-657	.	.	.	.	500	.
CP83-670	.	.	.	.	125	.
LCP81-005	.	99	.	.	147	.
LCP81-010	102	86	79	.	128	.
LCP81-030	111	90	500	120	.	.
LCP82-046	109	88	81	.	137	.
LCP82-047	.	.	.	132	.	.
LCP82-058	.	.	.	151	.	.
LCP82-073	.	.	.	.	.	174
LCP82-089	.	.	.	128	.	.
LCP83-123	.	.	.	.	139	.
LCP83-133	.	.	.	108	.	.
LCP83-136	.	.	.	.	.	133
LCP83-137	.	.	.	.	.	147
LCP83-149	.	.	.	.	.	500
LCP83-151	.	.	.	163	.	.
LCP83-153	.	.	.	.	.	133
LCP83-159	.	.	.	.	.	170
LCP83-164	.	.	.	.	.	135
LCP83-165	.	79	.	.	118	.
LCP83-169	.	.	.	.	.	145
LCP83-179	.	.	.	.	.	153
LCP84-200	.	95	.	.	140	.
LCP84-211	127	.	.	137	.	.
LCP84-212	.	.	97	.	.	.
LCP84-214	.	.	.	.	.	125
LCP84-215	.	.	.	.	.	136
LCP84-222	.	.	.	109	.	.
LCP84-257	.	.	73	113	.	.
LCP86-391	.	100	700	.	.	.
L74-049	.	.	.	700	.	.
L75-002	.	.	.	145	.	.
L75-056	108	92	700	113	.	.
L77-038	110	.	500	112	.	.
L78-063	114	.	90	122	.	.
L79-012	.	.	.	.	.	500
L80-035	109	.	.	.	.	.
L81-001	.	.	.	.	97	.
L84-224	.	.	.	.	450	.
L84-238	.	76	70	.	115	.
L84-245	.	.	.	.	139	.
L84-261	.	.	.	109	.	.
L84-262	.	.	.	117	.	.
L84-264	.	93	.	118	.	142
L84-265	.	.	.	.	152	.
L84-273	.	.	.	.	128	.
L84-275	.	.	165	.	.	.
L84-276	.	.	.	.	146	.
L84-280	.	103	.	.	.	.
L84-290	.	.	.	130	.	.
US74-090	.	.	.	.	.	146
US77-010	114	.	700	130	.	500
US77-017	.	.	700	.	156	.

1/ . = variety was not subjected to photoperiod treatment.
<400 = days to first flower for the variety.
400 = first flower had only emerged by end of crossing campaign.
450 = first flower was in boot stage by end of crossing campaign.
500 = only internal signs of induction were found at end of crossing campaign.
700 = no internal signs of induction were found at end of crossing campaign.

Table 2. Date of first flower for the varieties exposed to natural induction on the greenhouse rail system.

Variety	Flowering Date 1/	Variety	Flowering Date
CP48-103	700	LCP81-015	400
CP52-068	400	LCP85-295	700
CP61-037	500	LCP85-296	341
CP62-258	350	LCP85-298	500
CP65-357	364	LCP85-307	700
CP67-412	352	LCP85-313	355
CP69-1052	700	LCP85-315	355
CP69-373	364	LCP85-316	700
CP70-300	500	LCP85-319	400
CP71-357	700	LCP85-320	700
CP71-441	500	LCP85-329	355
CP72-1312	350	LCP85-335	700
CP72-2086	700	LCP85-336	364
CP72-355	345	LCP85-337	400
CP72-370	700	LCP85-340	600
CP73-343	700	LCP85-341	355
CP73-351	364	LCP85-344	355
CP74-383	364	LCP85-346	355
CP83-659	450	LCP85-347	700
CP84-713	400	LCP85-352	700
CP84-714	400	LCP85-354	500
CP84-716	700	LCP85-358	350
CP84-722	700	LCP85-359	341
CP84-723	700	LCP85-360	341
CP84-726	700	LCP85-361	364
CP84-730	700	LCP85-369	700
CP84-734	700	LCP85-371	350
CP84-737	700	LCP85-373	700
CP84-738	700	LCP85-376	500
CP84-742	400	LCP85-378	364
CP84-746	348	LCP85-384	357
CP84-750	357	LCP85-385	352
CP84-752	500	LCP86-391	700
CP84-755	700	L75-056	700
CP84-761	450	L78-035	355
CP84-764	700	L84-205	700
CP84-768	700	L85-294	352
CP84-772	700		

Data is:

<400 = date of first flower (Julien)
400 = first flower had only emerged by end of crossing campaign
450 = first flower was in boot stage by end of crossing campaign
500 = only internal signs of induction were found at end of crossing campaign
700 = no internal signs of induction were found at end of crossing campaign

Table 3. Crosses and seed produced during the 1987 crossing campaign. 1/

Female Parent	Female Tassels	Male Parent	Male Tassels	Cross	Viable Seed
CP48-103	1	CP62-258	1	XL87-325	333
CP48-103	1	CP73-340	1	XL87-245	59
CP48-103	1	CP83-606	1	XL87-289	0
CP48-103	1	LCP83-165	4	XL87-293	286
CP48-103	1	LCP84-200	1	XL87-313	342
CP48-103	1	SELF	.	XL87-038	547
CP52-068	1	CP72-355	2	XL87-146	177
CP52-068	1	CP72-355	5	XL87-324	80
CP52-068	1	LCP81-030	2	XL87-144	1501
CP52-068	1	LCP85-313	1	XL87-345	21
CP52-068	1	LCP85-371	2	XL87-346	838
CP52-068	1	LCP85-371	1	XL87-348	1127
CP52-068	2	87P2	.	XL87-087	56
CP55-038	1	SELF	.	XL87-148	106
CP57-614	1	SELF	.	XL87-016	445
CP57-614	2	87P1	.	XL87-004	1148
CP61-037	1	CP57-614	4	XL87-073	53
CP61-037	1	CP65-357	2	XL87-156	0
CP61-037	1	CP67-412	2	XL87-102	230
CP61-037	1	CP67-412	3	XL87-108	40
CP61-037	1	CP67-412	3	XL87-109	36
CP61-037	1	CP67-412	2	XL87-110	15
CP61-037	1	CP78-317	2	XL87-129	47
CP61-037	1	CP79-318	2	XL87-140	24
CP61-037	1	CP79-318	2	XL87-141	152
CP61-037	2	CP80-313	6	XL87-055	240
CP61-037	1	LCP81-010	5	XL87-099	342
CP61-037	1	LCP81-010	5	XL87-124	0
CP61-037	2	LCP85-296	5	XL87-310	50
CP61-037	2	LCP85-359	4	XL87-320	0
CP61-037	1	SELF	.	XL87-119	0
CP62-258	1	SELF	.	XL87-078	0
CP65-357	1	CP61-037	3	XL87-118	34
CP65-357	1	CP67-412	3	XL87-100	52
CP65-357	1	CP67-412	3	XL87-101	106
CP65-357	1	CP70-321	4	XL87-058	28
CP65-357	1	CP70-330	2	XL87-117	44
CP65-357	1	CP77-402	3	XL87-056	1632
CP65-357	1	CP80-352	2	XL87-053	122
CP65-357	1	LCP81-030	2	XL87-106	734
CP65-357	1	LCP85-329	1	XL87-351	0
CP65-357	1	LCP85-329	1	XL87-353	0
CP65-357	1	L78-063	3	XL87-134	2788
CP65-357	1	SELF	.	XL87-157	0
CP67-412	1	SELF	.	XL87-091	32
CP69-373	1	SELF	.	XL87-263	0
CP70-300	1	CP48-103	1	XL87-155	23
CP70-300	1	CP67-412	3	XL87-089	244
CP70-300	1	CP67-412	3	XL87-090	312
CP70-300	1	CP72-1312	1	XL87-331	11
CP70-300	1	CP75-1082	2	XL87-040	20
CP70-300	1	CP75-1082	2	XL87-208	278
CP70-300	1	LCP82-089	2	XL87-267	154
CP70-300	1	LCP85-360	2	XL87-305	0
CP70-300	1	L78-063	2	XL87-120	731
CP70-300	1	L84-261	3	XL87-199	2153
CP70-300	1	US77-010	2	XL87-180	2635
CP70-321	1	CP65-357	1	XL87-168	0
CP70-321	1	CP67-412	3	XL87-154	15
CP70-321	1	CP73-343	1	XL87-204	858
CP70-321	1	CP77-407	2	XL87-214	0
CP70-321	1	CP84-746	2	XL87-321	0
CP70-321	1	LCP84-257	1	XL87-260	0
CP70-321	1	LCP85-296	5	XL87-309	0
CP70-321	1	SELF	.	XL87-062	0
CP70-330	1	CP67-412	2	XL87-172	77
CP70-330	1	CP73-351	4	XL87-215	2356

Table 3. Continued.

Female Parent	Female Tassels	Male Parent	Male Tassels	Cross	Viable Seed
CP70-330	1	CP76-331	2	XL87-182	769
CP70-330	1	CP77-402	3	XL87-045	1074
CP70-330	2	CP80-329	3	XL87-048	1578
CP70-330	1	CP83-606	1	XL87-297	0
CP70-330	1	LCP81-010	2	XL87-167	58
CP70-330	1	LCP82-046	3	XL87-143	342
CP70-330	1	LCP84-200	3	XL87-066	74
CP70-330	1	LCP85-359	4	XL87-300	0
CP70-330	1	L75-002	1	XL87-274	1540
CP70-330	1	L78-035	1	XL87-358	45
CP70-330	1	L78-035	1	XL87-359	0
CP70-330	1	SELF	.	XL87-116	97
CP71-357	1	L78-035	1	XL87-338	432
CP71-357	1	L78-035	1	XL87-340	108
CP71-459	1	SELF	.	XL87-203	248
CP72-1210	1	CP73-343	4	XL87-075	1115
CP72-1210	1	SELF	.	XL87-098	13
CP72-1210	1	SELF	.	XL87-138	0
CP72-1312	1	SELF	.	XL87-333	96
CP72-355	1	SELF	.	XL87-136	107
CP72-370	1	CP67-412	4	XL87-213	74
CP72-370	1	CP76-331	2	XL87-194	979
CP72-370	1	LCP81-010	4	XL87-046	89
CP72-370	1	LCP81-010	4	XL87-047	84
CP72-370	1	LCP85-296	5	XL87-302	22
CP72-370	1	LCP85-359	4	XL87-308	0
CP72-370	1	L84-262	5	XL87-243	912
CP72-370	1	SELF	.	XL87-037	0
CP73-340	1	CP57-614	2	XL87-188	969
CP73-340	1	CP80-323	3	XL87-190	912
CP73-340	1	SELF	.	XL87-246	34
CP73-340	1	87P3	.	XL87-223	1152
CP73-343	1	CP77-402	3	XL87-187	1402
CP73-343	1	CP80-323	3	XL87-191	.
CP73-343	1	LCP84-222	2	XL87-196	229
CP73-343	1	SELF	.	XL87-026	157
CP73-345	1	CP48-103	2	XL87-094	680
CP73-345	1	CP55-038	3	XL87-153	784
CP73-345	1	CP62-258	3	XL87-077	14
CP73-345	1	CP75-1091	4	XL87-085	569
CP73-345	1	CP80-313	6	XL87-041	189
CP73-345	1	LCP81-030	3	XL87-240	272
CP73-345	1	LCP85-296	5	XL87-319	26
CP73-345	1	US74-090	2	XL87-287	31
CP73-351	1	SELF	.	XL87-216	18
CP74-1094	1	L78-063	2	XL87-235	162
CP74-383	1	CP48-103	4	XL87-132	388
CP74-383	1	CP57-614	2	XL87-015	1015
CP74-383	1	CP57-614	1	XL87-103	817
CP74-383	1	CP70-330	2	XL87-114	67
CP74-383	1	CP70-330	2	XL87-115	0
CP74-383	1	CP70-330	2	XL87-158	5
CP74-383	1	CP72-1210	2	XL87-097	67
CP74-383	2	CP72-355	5	XL87-315	71
CP74-383	1	CP72-370	4	XL87-018	.
CP74-383	1	CP72-370	4	XL87-019	118
CP74-383	1	CP72-370	4	XL87-020	.
CP74-383	2	CP77-402	3	XL87-043	2158
CP74-383	1	CP79-318	4	XL87-126	409
CP74-383	1	CP81-332	3	XL87-092	800
CP74-383	1	CP82-537	2	XL87-264	570
CP74-383	1	LCP81-030	2	XL87-107	612
CP74-383	1	LCP82-089	2	XL87-266	344
CP74-383	1	LCP85-313	1	XL87-343	390
CP74-383	2	L84-264	2	XL87-027	1375
CP74-383	1	87P2	.	XL87-082	691

Table 3. Continued.

Female Parent	Female Tassels	Male Parent	Male Tassels	Cross	Viable Seed
CP75-1082	1	SELF	.	XL87-022	909
CP75-1082	1	87P3	.	XL87-206	3952
CP75-1091	1	SELF	.	XL87-086	418
CP75-308	1	CP73-351	2	XL87-255	0
CP75-308	1	L78-063	2	XL87-252	246
CP75-327	2	CP77-402	3	XL87-057	2238
CP75-327	1	L75-056	3	XL87-071	1872
CP75-361	1	CP72-1210	2	XL87-137	260
CP75-361	1	LCP81-030	2	XL87-133	626
CP76-331	1	SELF	.	XL87-034	465
CP77-310	1	SELF	.	XL87-210	136
CP77-402	1	SELF	.	XL87-044	164
CP77-405	1	CP76-331	1	XL87-074	650
CP77-405	1	LCP82-089	3	XL87-219	2275
CP77-405	1	LCP83-151	1	XL87-239	1292
CP77-405	1	LCP84-257	2	XL87-230	462
CP77-405	1	L84-261	3	XL87-200	2856
CP77-405	1	SELF	.	XL87-096	767
CP77-407	1	87P3	.	XL87-207	2480
CP77-410	1	SELF	.	XL87-032	77
CP77-410	2	87P1	.	XL87-003	182
CP77-414	1	CP67-412	4	XL87-224	34
CP77-414	1	LCP83-151	1	XL87-259	117
CP78-317	1	CP57-614	2	XL87-166	252
CP78-317	1	CP67-412	1	XL87-253	11
CP78-317	1	LCP81-030	2	XL87-139	304
CP78-317	2	L75-056	2	XL87-009	212
CP78-317	1	SELF	.	XL87-012	75
CP78-317	1	87P1	.	XL87-001	22
CP78-317	1	87P2	.	XL87-088	16
CP79-318	2	CP48-103	1	XL87-036	3165
CP79-318	2	CP73-343	4	XL87-054	1793
CP79-318	2	CP75-1082	2	XL87-039	10886
CP79-318	2	CP80-313	4	XL87-104	1436
CP79-318	1	CP80-352	2	XL87-052	58
CP79-318	1	LCP82-089	1	XL87-238	9920
CP79-318	1	LCP85-371	2	XL87-347	4536
CP79-318	1	L75-056	2	XL87-008	2117
CP79-318	1	L84-264	2	XL87-221	13125
CP79-318	1	L84-264	4	XL87-311	6660
CP79-318	1	SELF	.	XL87-127	42
CP79-318	1	US77-010	2	XL87-063	2992
CP79-318	2	87P1	.	XL87-006	2244
CP79-332	1	LCP84-211	1	XL87-272	65
CP79-332	1	L78-035	1	XL87-339	546
CP79-332	1	L84-273	1	XL87-276	228
CP79-348	1	CP57-614	2	XL87-111	21
CP79-348	1	CP57-614	2	XL87-112	24
CP79-348	1	CP62-258	1	XL87-326	46
CP79-348	1	CP72-355	2	XL87-135	426
CP79-348	1	CP77-310	2	XL87-257	191
CP79-348	1	CP79-318	4	XL87-125	43
CP80-313	1	CP80-328	3	XL87-013	99
CP80-313	2	LCP81-030	3	XL87-145	2225
CP80-313	1	LCP85-371	1	XL87-349	1102
CP80-313	1	SELF	.	XL87-030	25
CP80-323	1	CP71-459	3	XL87-202	8400
CP80-323	1	CP76-331	5	XL87-193	785
CP80-323	1	CP77-402	1	XL87-181	725
CP80-323	1	LCP81-030	1	XL87-164	611
CP80-323	1	LCP85-360	2	XL87-304	0
CP80-323	1	LCP85-371	1	XL87-327	109
CP80-323	1	SELF	.	XL87-177	252
CP80-328	1	L77-038	1	XL87-023	1215
CP80-328	1	SELF	.	XL87-014	198
CP80-329	1	LCP81-030	1	XL87-175	221

Table 3. Continued.

Female Parent	Female Tassels	Male Parent	Male Tassels	Cross	Viable Seed
CP80-329	1	SELF	.	XL87-049	59
CP80-352	1	CP73-343	2	XL87-105	2820
CP80-352	1	CP80-313	6	XL87-029	1254
CP80-352	1	SELF	.	XL87-051	23
CP80-356	2	LCP85-359	2	XL87-330	304
CP81-325	1	LCP82-047	1	XL87-250	0
CP81-325	2	LCP85-385	1	XL87-335	1485
CP81-332	1	LCP81-010	4	XL87-122	1313
CP81-332	1	SELF	.	XL87-093	244
CP82-513	1	CP65-357	1	XL87-261	0
CP82-513	1	CP73-351	1	XL87-278	0
CP82-519	1	L78-063	1	XL87-270	345
CP82-520	1	LCP81-030	1	XL87-150	48
CP82-520	1	SELF	.	XL87-160	0
CP82-537	1	SELF	.	XL87-265	190
CP82-550	1	CP70-321	4	XL87-059	0
CP82-550	1	CP70-321	2	XL87-060	0
CP82-550	1	CP70-321	2	XL87-061	30
CP82-550	1	LCP82-046	4	XL87-130	59
CP82-550	1	US77-010	2	XL87-064	1027
CP83-606	1	CP75-1082	1	XL87-174	41
CP83-606	1	LCP82-058	4	XL87-227	394
CP83-606	1	SELF	.	XL87-290	0
CP83-607	1	SELF	.	XL87-282	0
CP83-625	1	L77-038	5	XL87-179	27
CP83-631	1	CP72-370	1	XL87-299	0
CP83-631	1	LCP82-089	2	XL87-251	5506
CP83-631	1	SELF	.	XL87-280	0
CP83-632	1	L78-035	1	XL87-341	421
CP83-670	1	CP69-373	1	XL87-262	0
CP83-670	1	CP73-351	3	XL87-237	33
CP84-746	1	SELF	.	XL87-323	0
LCP81-005	1	CP62-258	3	XL87-076	88
LCP81-005	1	CP72-370	4	XL87-035	137
LCP81-005	1	LCP83-165	1	XL87-080	0
LCP81-005	1	L75-056	3	XL87-072	2591
LCP81-010	1	CP67-412	1	XL87-292	1008
LCP81-010	2	CP72-355	5	XL87-317	83
LCP81-010	2	CP73-343	6	XL87-025	7802
LCP81-010	1	CP77-310	1	XL87-286	117
LCP81-010	2	CP77-410	1	XL87-031	504
LCP81-010	1	L84-261	1	XL87-283	2974
LCP81-030	1	SELF	.	XL87-070	97
LCP82-046	1	CP48-103	1	XL87-229	4529
LCP82-046	1	CP57-614	2	XL87-113	395
LCP82-046	1	CP70-321	4	XL87-079	0
LCP82-046	1	CP72-1312	1	XL87-332	20
LCP82-046	1	CP72-355	2	XL87-162	0
LCP82-046	2	CP76-331	2	XL87-042	2528
LCP82-046	2	CP80-352	2	XL87-050	40
LCP82-046	1	CP82-520	1	XL87-161	38
LCP82-046	1	LCP81-030	3	XL87-069	2058
LCP82-046	1	LCP81-030	1	XL87-169	612
LCP82-046	1	LCP85-313	1	XL87-342	74
LCP82-046	1	LCP85-313	1	XL87-344	0
LCP82-046	1	SELF	.	XL87-131	25
LCP82-046	1	87P1	.	XL87-005	477
LCP82-046	1	87P3	.	XL87-205	3346
LCP82-047	1	SELF	.	XL87-226	2795
LCP82-058	1	SELF	.	XL87-228	648
LCP82-073	1	LCP85-371	1	XL87-328	293
LCP82-089	1	SELF	.	XL87-220	2163
LCP83-123	1	LCP81-030	2	XL87-298	0
LCP83-133	1	SELF	.	XL87-234	49
LCP83-136	1	CP57-614	2	XL87-178	426
LCP83-136	1	CP72-370	3	XL87-186	29

Table 3. Continued.

Female Parent	Female Tassels	Male Parent	Male Tassels	Cross	Viable Seed
LCP83-136	1	CP76-331	2	XL87-184	178
LCP83-136	1	CP79-318	1	XL87-149	17
LCP83-136	1	CP82-520	1	XL87-159	0
LCP83-137	1	CP57-614	2	XL87-189	621
LCP83-137	1	CP76-331	2	XL87-183	218
LCP83-137	1	CP80-323	3	XL87-192	413
LCP83-151	1	SELF	.	XL87-247	824
LCP83-153	1	CP55-038	3	XL87-147	211
LCP83-153	1	LCP81-030	3	XL87-242	447
LCP83-159	1	SELF	.	XL87-269	67
LCP83-164	1	CP72-1210	2	XL87-151	20
LCP83-164	1	LCP83-133	2	XL87-233	12
LCP83-165	1	CP76-331	2	XL87-033	537
LCP83-165	1	CP78-317	2	XL87-123	33
LCP83-165	1	SELF	.	XL87-081	.
LCP83-165	1	SELF	.	XL87-295	0
LCP83-169	1	CP55-038	1	XL87-232	113
LCP83-169	1	CP67-412	2	XL87-173	31
LCP83-169	1	CP72-370	3	XL87-185	0
LCP83-169	1	LCP82-046	1	XL87-248	0
LCP83-169	1	LCP84-222	2	XL87-195	223
LCP83-179	1	CP83-607	2	XL87-281	0
LCP83-179	1	CP83-631	2	XL87-279	0
LCP83-179	2	CP84-746	2	XL87-322	57
LCP83-179	1	LCP84-222	1	XL87-296	0
LCP84-200	1	CP67-412	1	XL87-291	0
LCP84-200	1	CP72-355	5	XL87-316	128
LCP84-200	1	CP75-1082	2	XL87-021	2819
LCP84-200	1	SELF	.	XL87-067	31
LCP84-200	1	SELF	.	XL87-314	0
LCP84-211	1	CP72-355	2	XL87-163	0
LCP84-211	1	SELF	.	XL87-273	0
LCP84-212	1	87P2	.	XL87-084	683
LCP84-214	1	CP72-370	2	XL87-198	21
LCP84-214	1	CP80-323	1	XL87-176	1415
LCP84-214	1	L77-038	1	XL87-271	113
LCP84-215	1	CP77-310	1	X187-209	100
LCP84-215	1	CP80-323	4	XL87-212	988
LCP84-215	1	LCP81-030	1	XL87-256	2100
LCP84-215	1	L75-056	3	XL87-217	1570
LCP84-222	1	L75-056	3	XL87-218	266
LCP84-222	1	SELF	.	XL87-197	0
LCP84-257	1	CP80-323	4	XL87-211	78
LCP84-257	1	SELF	.	XL87-231	44
LCP85-296	1	SELF	.	XL87-303	0
LCP85-313	1	SELF	.	XL87-355	5
LCP85-329	1	SELF	.	XL87-357	0
LCP85-358	1	SELF	.	XL87-334	0
LCP85-359	1	SELF	.	XL87-301	0
LCP85-360	1	SELF	.	XL87-306	0
LCP85-371	1	SELF	.	XL87-329	0
LCP85-371	1	SELF	.	XL87-356	49
LCP85-385	1	SELF	.	XL87-336	244
LCP86-391	2	CP78-317	3	XL87-011	302
L75-002	1	SELF	.	XL87-275	0
L75-056	1	SELF	.	XL87-010	132
L77-038	1	SELF	.	XL87-024	522
L77-038	1	SELF	.	XL87-171	189
L78-035	1	SELF	.	XL87-354	3682
L78-063	1	SELF	.	XL87-121	731
L78-063	1	87P1	.	XL87-007	1183
L78-063	1	87P2	.	XL87-083	1334
L80-035	1	CP72-355	2	XL87-152	646
L80-035	1	CP77-405	2	XL87-095	7197
L81-001	1	CP57-614	2	XL87-165	213
L81-001	1	L77-038	4	XL87-170	294

Table 3. Continued.

Female Parent	Female Tassels	Male Parent	Male Tassels	Cross	Viable Seed
L84-238	1	CP77-310	2	XL87-258	0
L84-238	1	LCP81-030	3	XL87-068	142
L84-238	1	LCP81-030	3	XL87-241	80
L84-238	1	LCP83-159	1	XL87-268	15
L84-238	5	87P1	.	XL87-002	270
L84-261	1	SELF	.	XL87-201	148
L84-261	1	SELF	.	XL87-284	78
L84-262	1	SELF	.	XL87-236	992
L84-262	1	SELF	.	XL87-244	.
L84-264	1	SELF	.	XL87-028	58
L84-264	1	SELF	.	XL87-222	59
L84-264	1	SELF	.	XL87-312	36
L84-265	1	LCP83-165	4	XL87-294	63
L84-273	1	SELF	.	XL87-277	41
L84-275	1	CP77-310	1	XL87-285	154
L84-276	1	CP72-355	5	XL87-318	338
L84-280	1	CP67-412	3	XL87-128	17
L84-280	2	CP78-317	4	XL87-017	223
L84-290	1	CP70-321	1	XL87-142	0
L84-290	1	SELF	.	XL87-307	0
L85-294	2	CP67-412	1	XL87-337	133
L85-294	1	L78-035	1	XL87-360	792
US74-09	1	CP67-412	1	XL87-254	0
US74-090	1	CP77-310	1	XL87-249	78
US74-090	1	SELF	.	XL87-288	0
US77-010	1	LCP82-047	2	XL87-225	872
US77-010	1	SELF	.	XL87-065	0
US77-017	1	LCP85-329	1	XL87-350	12
US77-017	1	LCP85-329	1	XL87-352	0

1/ Crosses that were repeated for experimental purposes were assigned different cross numbers.

Selections, Line Trials and Assignments for the Year 1987

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A summary of selections, advancements and assignments made during 1987 by LSU Sugarcane Variety Improvement Program personnel are presented in Table one. During the month of February, 1987, 84,000 seedlings representing 236 crosses were potted and placed in the greenhouse at the St. Gabriel Research Station. These crosses were made at the LSU facility during the years 1983, 1984, 1985 and 1986. In April, 65,702 single stools were established in the field.

Sixty-four thousand thirty-six single stools overwintered during 1987 and were available for selection in September. Of these, 3,503 or 5.5% were advanced to six-foot first line trial plots. These clones met or exceeded minimum standards for growth habit, stalk number, stalk diameter, stalk height, brix (by hand refractometer) and absence of pith and/or tube.

Based on agronomic ratings, degree of lodging, brix and absence of pith and/or tube as compared to commercial check plots, 1,334 second line trial plots (15 foot) were planted. This number represents 28% of the 4,743 first line trial plots evaluated.

Of the 1,064 second line trial plots planted in the fall of 1986, 264 or approximately 25% were planted in 15 foot increase plots and will be candidates for assignment in 1988. These advancements were made based on the afore mentioned criteria along with stalk counts and sucrose data obtained from six-stalk samples cut from each plot.

There were 320 candidates for assignment in second line trial stubble plots in 1987. Based on agronomic ratings, stalk counts and three years' sucrose analyses, 54 clones were assigned permanent "LCP87" variety numbers (Table 2). This designation indicates that these clones are progenies of crosses made in Canal Point, Florida by USDA personnel but selected and advanced by LSU personnel at the St. Gabriel Research Station.

Tables three through five show the progeny performance of crosses based on the actual numbers of individuals of each cross advancing through the breeding program. Table three lists the crosses and the number of individuals of each cross advancing to increase plots in 1987. Column one lists cross numbers, columns two and three are the parents of each cross. The fourth column, "survive", is the number of clones of each cross surviving the transplanting operation. The column labeled "owinter" indicates the number of individuals available for selection in 1985 as single stools. The sixth column, "first", lists the number of clones of each cross advanced to first line trial plots from single stools. The "second" column indicates the number of individuals advanced from first to second line trial plots in 1986. The column labeled "increase" indicates the number of clones from each cross that will be considered for assignment in 1988. The "RKS" columns indicate the percentile ranking of each cross using the number of plants surviving transplanting as a base.

Table four lists the number of clones from their respective crosses advancing to second line trial plots in 1987. Their progress can be followed as in table three. These clones were initially selected from stubble single stools in 1986. Table five indicates the crosses and the number of progenies of each that were advanced from stubble single stools to first line trial plots in 1987.

Table 1. Summary of selections, advancements and assignments made during 1987 by the LSU Sugarcane Variety Improvement Program.

CROSSING SERIES	# OF CROSSES	SEEDLINGS POTTED	SEEDLINGS TO FIELD	SURVIVED PLANTING	AVAILABLE FOR SELECTION	ADVANCED TO 1ST LINES	ADVANCED TO 2ND LINES	CANDIDATES FOR ASSIGNMENT	ASSIGNED IN 1987
82	99	76,928	66,651	45,714	25,357	3,397	1,136	320	54*
83	194	80,000	67,167	54,756	37,967	3,810	1,064	264*	
84	181	84,000	77,127	70,764	54,000	4,743	1,334*		
85	219	84,000	77,000	74,866	64,036	3,503*			
86	236	84,000*	70,310*	65,702*					

* Work done in 1987

Table 2. Summary of the data on the varieties assigned permanent "LCP" numbers in 1987.

VARIETY	PARENTS	MSTWT	T/A	S/T	S/A
CP61-037		2.21	27.4	205	5695
CP65-357		2.28	27.3	242	6633
CP70-321		2.22	34.1	248	8652
CP74-383		2.34	29.2	225	7117
LCP87-471	CP72-356 X CP70-330	2.09	39.1	210	8774
LCP87-472	CP72-356 X CP70-330	1.87	45.1	216	9374
LCP87-473	CP75-361 X CP77-418	2.32	38.9	244	9169
LCP87-474	L65-069 X CP70-330	1.97	48.2	216	10372
LCP87-475	L65-069 X CP70-330	2.54	38.5	226	8324
LCP87-476	CP66-346 X CP70-330	2.37	37.1	216	8521
LCP87-477	CP74-383 X CP78-349	2.62	39.4	213	8959
LCP87-478	CP66-346 X CP70-330	2.22	50.5	209	10595
LCP87-479	CP72-356 X CP70-330	2.44	36.3	232	8142
LCP87-480	CP72-356 X CP70-330	2.71	37.1	246	8924
LCP87-481	CP72-356 X CP70-330	2.16	37.3	220	8027
LCP87-482	CP74-383 X CP70-330	1.99	39.4	209	8630
LCP87-483	CP74-383 X CP70-330	1.48	32.0	229	8053
LCP87-484	CP79-302 X CP72-356	2.25	37.6	230	9568
LCP87-485	CP74-387 X CP70-330	2.08	39.7	214	8796
LCP87-486	CP78-344 X CP77-310	2.02	35.4	235	8083
LCP87-487	CP78-344 X CP77-310	2.19	44.4	236	10856
LCP87-488	CP75-327 X CP73-308	2.45	41.3	242	10081
LCP87-489	CP65-357 X CP70-330	2.51	40.5	225	8920
LCP87-490	CP66-346 X CP70-330	2.45	39.1	220	9120
LCP87-491	BC3 - BENDA	2.00	48.2	225	11815
LCP87-492	CP65-357 X CP70-330	1.81	29.7	228	6680
LCP87-493	CP74-383 X CP72-355	2.14	63.7	187	12105
LCP87-494	CP74-383 X CP78-349	2.42	36.1	225	8370
LCP87-495	CP66-346 X CP70-330	2.36	43.5	200	9121
LCP87-496	CP65-357 X CP70-330	2.29	35.7	239	8661
LCP87-497	CP73-308 X CP77-413	2.15	36.2	242	8436
LCP87-498	CP65-357 X CP70-330	2.55	40.0	228	8943
LCP87-499	CP65-357 X CP70-330	2.23	34.5	238	8023
LCP87-001	CP78-344 X CP73-308	2.15	39.3	227	9388
LCP87-002	CP77-310 X CP77-418	2.19	39.3	227	8841
LCP87-003	BC3 - BENDA	2.37	41.9	224	8896
LCP87-004	CP74-387 X CP77-418	1.94	42.6	226	10471
LCP87-005	CP75-327 X CP73-308	1.90	32.2	221	7142
LCP87-006	CP76-350 X CP73-350	2.03	30.2	234	7300
LCP87-007	CP79-302 X CP67-412	1.75	37.7	227	8558
LCP87-008	CP79-302 X CP67-412	2.10	33.1	238	7694
LCP87-009	CP77-310 X CP77-403	2.19	32.5	209	7751
LCP87-010	CP66-346 X CP70-330	2.31	46.5	217	11164
LCP87-011	BC3 - BENDA	2.07	36.1	222	8214
LCP87-012	CP74-387 X CP77-418	2.55	38.8	207	8191
LCP87-013	CP77-310 X CP77-403	2.69	38.9	250	10148
LCP87-014	CP74-383 X CP67-412	2.42	39.1	217	8855
LCP87-015	CP65-357 X CP70-330	2.21	33.3	251	8310
LCP87-016	CP74-383 X CP77-418	2.44	34.9	236	8230
LCP87-017	CP74-383 X CP67-412	2.33	59.9	215	13937
LCP87-018	CP75-327 X CP73-308	1.87	40.1	225	9067
LCP87-019	CP65-357 X CP70-330	2.02	37.6	219	8979
LCP87-020	CP74-383 X CP78-304	2.35	34.6	248	8646
LCP87-021	CP74-322 X CP77-403	2.26	32.1	263	8362
LCP87-022	CP73-345 X CP72-370	2.34	50.0	248	11861
LCP87-023	CP76-350 X CP73-351	2.62	36.0	272	9872
LCP87-024	CP77-403 X CP66-346	3.27	43.5	240	9642
LCP87-025	CP75-327 X CP77-418	1.94	39.4	239	9136

Table 3. List of crosses of the '83' crossing series and the performance of their progenies through the increase plot stage planted in 1987.

CROSS 1/	FEMALE	MALE	SURVIVE	OWINTER	FIRST	RKS I	SECOND	RKS 2	INCREASE	RKS I
XCP83-0486	CP79-301	CP80-323	216	174	33	95	18	98	1	34
XCP83-0489	CP79-301	CP80-346	230	171	19	72	9	84	2	63
XCP83-0495	CP79-302	CP80-323	216	191	23	87	10	89	5	93
XCP83-0501	CP74-383	CP79-327	344	223	25	64	5	43	.	.
XCP83-0502	CP74-383	CP80-323	731	570	43	51	14	57	2	9
XCP83-0503	CP74-383	CP78-338	229	186	9	27	2	20	1	28
XCP83-0510	CP79-318	CP80-323	209	111	27	92	11	92	1	37
XCP83-0513	CP79-318	CP78-304	150	99	24	97	7	89	3	91
XCP83-0519	CP79-332	CP77-310	195	156	29	95	9	89	2	72
XCP83-0521	CP79-348	CP74-387	229	164	17	66	2	20	1	28
XCP83-0525	CP79-301	CP68-1026	124	95	19	96	1	16	.	.
XCP83-0529	CP70-330	CP77-310	338	150	24	63	6	53	1	12
XCP83-0534	CP80-346	CP79-327	155	105	14	78	4	69	2	80
XCP83-0540	CP80-315	CP78-338	205	171	15	65	3	44	.	.
XCP83-0545	CP74-387	CP80-323	222	145	39	98	6	70	1	32
XCP83-0548	CP77-310	CP80-323	202	143	12	52	4	58	2	70
XCP83-0558	CP80-313	CP80-323	231	168	19	72	3	38	1	26
XCP83-0950	CP79-302	CP80-323	211	172	17	71	7	79	3	84
XCP83-0965	CP70-330	CP76-331	459	313	24	43	9	57	.	.
XL83-0001	CP76-331	L83P1	233	158	7	15	.	.	.	.
XL83-0003	CP73-1547	CP76-331	82	54	3	22	1	35	.	.
XL83-0008	CP57-614	CP57-614	23	11	4	98	4	99	.	.
XL83-0009	CP72-370	CP76-331	186	153	17	80	4	61	.	.
XL83-0010	CP76-331	CP76-331	56	21	.	.	.	.	.	.
XL83-0011	CP78-310	CP75-1091	37	30	3	71	1	70	.	.
XL83-0012	CP75-1091	CP75-1091	115	36	.	.	.	.	.	.
XL83-0013	CP75-1082	CP75-1082	22	15	2	79	1	88	1	98
XL83-0016	CP70-330	CP72-1312	200	121	14	63	2	25	1	38
XL83-0017	CP70-300	US77-010	190	125	7	23	2	28	1	41
XL83-0018	CP70-330	CP72-1210	87	35	3	20	1	32	.	.
XL83-0019	CP70-300	CP75-1091	202	90	2	2	.	.	.	.
XL83-0020	CP70-330	CP75-1091	128	52	7	47	2	47	1	57
XL83-0022	CP72-370	CP72-1210	82	63	12	94	7	98	.	.
XL83-0025	CP72-1312	CP72-370	16	11	.	.	.	.	.	.
XL83-0026	CP70-300	CP67-412	455	179	6	3	.	.	.	.
XL83-0027	CP70-330	CP62-258	213	124	8	24	.	.	.	.
XL83-0029	CP72-370	L83P2	247	181	21	74	3	35	.	.
XL83-0030	CP75-1091	L83P2	229	152	21	80	2	20	1	28
XL83-0031	CP72-1210	L83P2	177	95	10	49	2	31	.	.
XL83-0035	US77-010	US77-010	145	84	4	13	.	.	.	.
XL83-0037	CP67-412	CP67-412	78	38	1	3	.	.	.	.
XL83-0038	CP62-258	CP62-258	95	51	5	44	1	28	.	.
XL83-0039	CP67-412	L83P2	244	165	12	39	5	59	1	20
XL83-0040	CP57-614	L83P2	216	111	8	23	.	.	.	.
XL83-0042	CP72-370	CP70-321	143	97	14	83	8	94	1	51
XL83-0043	CP74-1263	CP70-321	145	124	20	93	.	.	.	.
XL83-0046	CP52-068	CP62-258	228	149	14	55	4	52	1	29
XL83-0047	CP70-330	CP67-412	221	158	12	46	3	41	1	33
XL83-0048	CP43-064	CP76-331	198	156	8	29	1	8	1	39
XL83-0053	CP70-321	CP67-412	91	57	6	59	2	63	.	.
XL83-0054	CP74-383	CP67-412	237	180	11	37	2	18	1	24
XL83-0057	CP79-332	CP62-258	61	59	12	98	2	79	.	.

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Table 3. Continued

CROSS	FEMALE	MALE	SURVIVE	OWINTER	FIRST	RKS 1	SECOND	RKS 2	INCREASE	RKS I
XL83-0058	CP78-310	CP62-258	97	73	6	55	1	27	.	.
XL83-0060	CP79-318	CP66-346	364	294	22	53	5	42	1	10
XL83-0061	CP73-375	CP66-346	137	88	2	4	1	14	1	53
XL83-0062	CP74-328	CP57-614	82	46	8	82	1	35	.	.
XL83-0063	CP75-327	CP57-614	74	43	1	3	.	.	.	.
XL83-0065	CP78-321	CP78-321	65	60	.	.	.	.	.	.
XL83-0066	CP66-346	CP66-346	232	147	4	5	1	4	.	.
XL83-0067	CP43-064	CP57-614	398	209	18	36	.	.	.	.
XL83-0068	CP65-357	CP70-321	430	301	24	49	6	42	2	35
XL83-0069	CP79-332	CP67-412	484	394	27	49	4	16	2	20
XL83-0070	CP79-301	CP62-258	262	192	28	87	5	56	3	77
XL83-0071	CP77-310	CP62-258	341	227	35	85	13	84	2	46
XL83-0072	CP79-318	CP62-258	166	114	8	38	1	11	1	48
XL83-0073	CP71-380	CP66-346	45	24	4	77	.	.	.	.
XL83-0074	CP79-332	CP72-370	551	456	73	93	8	43	5	66
XL83-0075	CP79-318	CP72-370	106	80	5	37	.	.	.	.
XL83-0076	CP76-340	CP72-370	117	92	3	12	1	18	.	.
XL83-0078	CP72-370	CP67-412	61	46	2	19	2	79	.	.
XL83-0083	CP74-383	CP57-614	218	129	16	65	2	22	.	.
XL83-0084	CP70-310	CP57-614	220	120	14	56	1	5	1	33
XL83-0085	CP72-1312	CP57-614	100	68	16	97	1	25	.	.
XL83-0086	CP78-310	CP57-614	245	202	19	68	3	35	1	19
XL83-0089	CP70-300	CP72-355	678	400	40	51	7	27	2	11
XL83-0090	CP71-380	CP72-355	87	58	8	80	1	32	.	.
XL83-0093	CP74-383	CP69-373	410	283	17	30	4	24	.	.
XL83-0094	CP75-327	CP69-373	98	46	8	72	4	86	1	72
XL83-0096	CP79-301	CP69-373	163	143	18	89	5	76	1	49
XL83-0097	CP65-357	CP69-373	539	410	37	61	13	65	5	68
XL83-0099	CP70-330	CP78-321	238	160	9	24	3	36	2	60
XL83-0102	CP72-370	CP70-321	119	83	6	41	2	51	.	.
XL83-0103	US77-017	CP77-310	149	117	8	45	5	80	2	82
XL83-0104	CP78-317	CP76-301	221	177	22	84	8	82	6	97
XL83-0105	CP79-311	CP76-301	239	188	26	88	7	74	5	92
XL83-0106	CP70-310	CP76-301	296	200	7	10	2	13	.	.
XL83-0107	CP72-370	L75-002	518	414	64	91	12	65	8	85
XL83-0108	CP65-357	CP77-402	1003	903	101	84	20	58	9	66
XL83-0109	CP76-301	CP76-301	230	135	12	43	3	39	2	63
XL83-0110	CP77-310	CP77-310	43	16	2	37	.	.	.	.
XL83-0111	L75-002	L75-002	33	27	.	.	.	.	.	.
XL83-0112	CP77-402	CP77-402	100	62	.	.	.	.	.	.
XL83-0113	CP73-375	L75-002	89	73	8	78	1	31	.	.
XL83-0114	CP71-380	L65-069	156	96	8	42	2	37	.	.
XL83-0115	CP71-1086	L65-069	501	305	33	59	6	34	2	18
XL83-0116	CP72-370	L65-069	511	327	41	71	13	68	2	17
XL83-0117	L65-069	L65-069	95	49	13	93	7	97	1	73
XL83-0118	CP71-1194	CP62-258	438	268	43	83	10	64	2	34
XL83-0119	CP74-383	CP72-355	583	444	90	96	12	60	.	.
XL83-0120	CP75-327	CP67-412	802	490	32	28	7	19	3	15
XL83-0123	CP72-1312	L65-069	651	500	38	51	10	47	.	.
XL83-0124	CP70-321	CP62-258	245	143	11	35	4	50	1	19
XL83-0126	CP70-310	CP72-355	240	180	15	56	5	60	1	22
XL83-0127	CP72-355	CP67-412	483	353	4	1	1	0	.	.
XL83-0128	CP71-1194	L65-069	474	257	24	41	4	18	1	5
XL83-0129	CP75-327	CP77-402	929	773	56	53	15	49	7	55

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Table 3. Continued

CROSS	FEMALE	MALE	SURVIVE	OWINTER	FIRST	RKS 1	SECOND	RKS 2	INCREASE	RKS I
XL83-0130	CP73-375	L75-002	225	149	6	13	1	5	1	30
XL83-0132	CP61-037	CP57-614	420	265	14	19	1	1	.	.
XL83-0133	CP61-039	CP57-614	434	299	18	31	5	32	1	6
XL83-0134	CP72-370	CP62-258	862	559	120	93	57	96	23	95
XL83-0135	CP71-1194	CP72-355	265	177	37	94	6	64	1	15
XL83-0136	CP71-1240	CP72-355	406	203	27	60	8	58	4	70
XL83-0137	CP79-318	CP72-355	1705	1001	114	60	19	30	2	1
XL83-0138	CP70-321	CP75 308	757	389	49	58	12	48	4	42
XL83-0139	CP61-037	CP70-321	701	465	28	28	4	10	1	2
XL83-0140	CP74-383	CP70-321	1222	875	95	69	34	73	9	54
XL83-0141	CP71-380	CP77-402	92	80	17	98	2	62	1	74
XL83-0143	CP70-321	CP77-402	72	55	3	31	.	.	.	.
XL83-0144	CP76-340	CP70-321	202	139	8	27	2	25	.	.
XL83-0145	US77-017	CP70-321	999	640	66	60	13	38	6	47
XL83-0146	CP75-308	CP75-308	99	51	3	16	.	.	.	.
XL83-0149	CP76-340	CP71-1240	217	160	15	62	.	.	.	.
XL83-0150	CP71-1240	CP71-1240	212	79	1	0	.	.	.	.
XL83-0151	CP61-037	CP78-304	787	588	73	81	14	53	5	49
XL83-0153	CP50-028	CP78-304	402	296	62	96	22	94	4	71
XL83-0154	CP78-304	CP78-304	121	92	13	88	3	67	1	59
XL83-0155	CP43-064	CP70-321	218	108	16	65	1	6	.	.
XL83-0157	CP48-103	CP77-310	1032	691	56	46	5	8	3	11
XL83-0159	CP79-332	CP77-310	421	359	37	77	5	33	5	77
XL83-0160	L75-002	CP77-310	77	57	7	79	.	.	.	.
XL83-0162	CP78-317	CP77-310	615	498	68	89	13	61	7	76
XL83-0163	CP79-311	CP77-310	142	94	11	68	1	14	.	.
XL83-0164	CP50-028	CP77-310	226	146	10	34	1	5	.	.
XL83-0166	CP78-304	CP77-310	1056	743	64	54	12	31	5	36
XL83-0167	LCP81-010	L80-045	185	139	9	39	4	62	1	43
XL83-0168	CP72-370	L80-045	169	111	39	99	6	81	.	.
XL83-0171	L81-001	CP77-310	225	193	16	63	.	.	.	.
XL83-0172	LCP81-010	CP77-310	170	118	8	37	3	52	.	.
XL83-0173	L79-018	CP72-355	171	100	5	15	1	11	.	.
XL83-0175	CP78-304	CP72-355	221	190	8	22	2	21	.	.
XL83-0176	CP80-352	CP72-355	218	185	19	76	4	54	2	67
XL83-0177	CP80-352	CP77-310	118	89	5	32	.	.	.	.
XL83-0180	CP71-380	CP77-310	197	143	16	72	2	26	1	40
XL83-0181	US77-017	LCP81-018	209	171	6	14	2	23	.	.
XL83-0182	CP80-352	LCP81-018	397	294	17	32	3	15	1	8
XL83-0183	L80-045	LCP81-026	216	126	15	62	3	42	2	68
XL83-0185	L79-018	LCP81-026	224	171	8	21	5	63	1	31
XL83-0186	CP74-383	L80-043	240	162	.	.	.	.	.	.
XL83-0187	L80-038	CP62-258	183	132	16	76	2	30	1	44
XL83-0189	L80-002	CP62-258	178	113	10	49	2	31	.	.
XL83-0190	L80-002	CP72-355	153	109	2	3	1	13	.	.
XL83-0191	CP61-039	CP72-355	205	162	5	11	.	.	.	.
XL83-0195	CP65-357	L79-018	224	186	4	5	3	40	1	31
XL83-0196	L80-002	L80-045	331	209	19	50	2	11	.	.
XL83-0197	L79-018	L79-018	193	66	.	.	.	.	.	.
XL83-0198	L80-043	L80-043	175	77	3	5	.	.	.	.
XL83-0199	L78-035	CP80-360	235	171	20	74	4	51	1	25
XL83-0203	L80-040	CP62-258	168	128	16	82	8	90	1	47
XL83-0204	L78-035	CP62-258	180	132	14	69	8	88	1	45
XL83-0206	CP74-383	L79-018	64	46	4	56	2	77	.	.

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Table 3. Continued

CROSS	FEMALE	MALE	SURVIVE	OWINTER	FIRST	RKS I	SECOND	RKS 2	INCREASE	RKS I
XL83-0207	CP80-317	CP76-301	413	326	27	59	5	34	1	6
XL83-0208	CP74-383	CP76-301	1322	965	72	47	20	45	5	16
XL83-0209	L78-035	CP76-301	464	298	32	61	14	75	.	.
XL83-0210	L81-002	LCP81-018	186	147	3	5	.	.	.	.
XL83-0211	CP52-068	LCP81-030	117	101	31	99	2	52	2	87
XL83-0212	CP65-357	LCP81-030	417	308	65	96	9	62	3	52
XL83-0214	CP80-325	CP77-310	202	145	4	7	2	25	.	.
XL83-0217	CP80-360	LCP81-018	218	128	.	.	.	.	.	.
XL83-0218	CP74-383	LCP81-030	235	192	20	74	6	69	1	25
XL83-0219	CP79-311	LCP81-030	198	159	22	89	5	67	1	39
XL83-0220	CP65-357	L78-063	453	324	22	39	1	1	.	.
XL83-0221	L75-002	L78-063	77	51	3	26	.	.	.	.
XL83-0222	L80-035	L78-063	250	170	19	67	2	15	.	.
XL83-0224	CP72-370	CP80-329	903	683	79	76	28	76	8	65
XL83-0228	CP72-370	CP80-315	74	67	6	71	4	93	2	96
XL83-0236	L79-012	CP62-258	198	138	40	99	8	85	3	84
XX83-3012	US79-13	CP70-1133	142	43	6	32	1	14	1	51
XX83-3014	US80-2	CP79-318	241	212	2	1	2	17	1	21
XX83-3016	US80-23	CP72-355	122	83	3	11	2	50	.	.
XX83-3018	US80-4	CP72-355	239	189	19	70	8	80	2	59
XX83-3021	US80-23	CP62-258	145	107	1	0	.	.	.	.
XX83-3042	L75-035	US80-3	461	354	13	14	5	29	2	27
XX83-3052	US80-27	CP70-1133	213	144	20	81	6	73	.	.
XX83-3053	US80-5	CP70-1133	242	151	18	66	1	4	.	.
XX83-3054	US77-11	CP70-1133	177	115	16	79	7	85	3	87
XX83-3055	US80-10	CP70-1133	240	148	8	19	2	17	1	22
XX83-3077	CP65-357	US80-9	139	119	5	22	3	62	.	.
XX83-3079	US79-10	CP70-1133	228	211	17	67	6	69	2	64
XX83-3082	CP79-332	US80-11	148	98	19	92	8	93	3	91
XX83-3083	CP79-318	US80-8	231	175	27	91	9	84	2	62
XX83-3085	CP70-330	US80-8	228	131	14	55	3	39	2	64
XX83-3089	US80-28	CP78-304	229	201	4	5	.	.	.	.
XX83-3091	US80-9	CP78-304	140	100	2	4	1	14	.	.
XX83-3103	US80-24	CP79-327	94	76	7	67	4	87	1	73

1/ XCP designates crosses made at Canal Point, Florida
XL designates crosses made at St. Gabriel, Louisiana
XX designates crosses made at Houma, Louisiana

Table 4. List of crosses of the '84' crossing series and the performance of their progenies through the second line trial stage planted in 1987.

CROSS	FEMALE	MALE	SURVIVE	OWINTER	FIRST	RKS 1	SECOND	RKS 2
XL83-0047	CP70-330	CP67-412	209	148	15	64	8	84
XL83-0054	CP74-383	CP67-412	258	232	10	26	3	33
XL83-0113	CP73-375	L75-002	473	344	25	44	3	12
XL83-0157	CP48-103	CP77-310	865	644	45	43	14	50
XL83-0160	L75-002	CP77-310	565	470	47	73	18	77
XL83-0161	CP72-355	CP77-310	263	191	26	83	4	46
XL84-MISC			.	.	2	.	1	.
XL84-0006	CP79-348	CP77-414	242	226	6	12	1	4
XL84-0007	CP77-1414	CP77-414	189	170	2	2	1	9
XL84-0011	US77-14	CP77-310	147	113	18	91	8	94
XL84-0016	US77-10	84P1	193	138	8	30	2	27
XL84-0017	L75-056	84P1	215	107	11	42	1	7
XL84-0018	CP48-103	CP67-411	863	591	57	60	10	32
XL84-0021	L81-001	CP67-411	203	102	4	7	2	24
XL84-0022	CP70-330	CP72-356	444	360	45	85	16	82
XL84-0023	L80-002	CP72-356	216	185	18	73	4	55
XL84-0025	US77-1	CP77-414	68	50	6	77	1	45
XL84-0026	CP72-356	CP77-414	236	164	14	52	.	.
XL84-0027	L81-001	CP77-414	731	582	33	35	6	16
XL84-0029	CP70-330	CP72-370	223	156	10	34	3	40
XL84-0030	CP79-348	CP72-370	166	143	15	78	10	95
XL84-0032	CP48-103	CP77-310	441	315	20	36	6	41
XL84-0033	L80-002	CP77-310	217	157	13	53	1	6
XL84-0034	CP75-1322	CP77-310	444	360	31	62	11	67
XL84-0035	L81-001	CP77-310	476	404	37	69	20	86
XL84-0036	CP70-300	CP75-1082	399	313	21	44	9	64
XL84-0037	CP48-103	CP75-1082	386	293	24	56	5	38
XL84-0038	US77-10	CP75 1082	128	108	.	.	.	.
XL84-0039	L81-001	CP75-1082	209	147	4	6	2	23
XL84-0041	CP72-356	CP57-614	626	460	38	54	10	48
XL84-0044	L80-002	CP76-331	302	188	15	40	9	74
XL84-0045	CP74-2005	CP76-331	210	161	2	2	.	.
XL84-0046	CP75-1632	CP76-331	67	30	2	15	.	.
XL84-0047	CP70-330	CP76-331	612	410	43	63	11	53
XL84-0051	CP81-316	LCP81-026	243	179	24	83	3	36
XL84-0052	CP79-302	LCP81-026	203	202	31	95	11	93
XL84-0054	CP53-018	CP77-310	425	311	30	63	13	75
XL84-0055	CP74-2005	CP77-310	60	54	5	73	2	80
XL84-0056	CP74-383	CP72-1312	244	196	19	69	6	66
XL84-0058	L79-018	CP77-414	461	418	10	8	5	29
XL84-0060	CP70-300	CP72-1312	193	146	8	30	2	27
XL84-0072	CP80-324	CP70-321	93	66	6	57	.	.
XL84-0078	CP77-405	84P2	190	99	8	31	4	61
XL84-0079	CP79-302	84P2	422	344	42	84	13	76
XL84-0113	CP78-317	L78-063	165	163	15	79	7	87
XL84-0130	CP80-352	CP75-308	392	362	20	41	5	37
XL84-0133	CP52-068	CP75-308	411	371	35	75	9	63
XL84-0139	L77-038	CP66-346	373	367	34	80	6	49
XL84-0148	CP61-039	FLORIDAS	222	203	10	35	2	21
XL84-0149	CP48-103	CP77-402	477	425	31	58	12	67
XL84-0150	CP65-357	CP77-402	440	386	17	25	2	5
XL84-0157	CP77-405	CP76-331	281	205	26	81	6	61
XL84-0163	CP61-037	CP73-351	156	127	13	73	2	37
XL84-0167	CP72-370	CP66-346	209	192	18	75	3	43
XL84-0168	CP74-383	LCP81-030	1424	1167	127	78	13	22

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Table 4. Continued

CROSS	FEMALE	MALE	SURVIVE	OWINTER	FIRST	RKS I	SECOND	RKS 2
XL84-0169	L80-035	LCP81-030	669	512	103	96	35	92
XL84-0179	CP75-360	CP76-331	570	428	22	25	5	21
XL84-0184			.	.	17	.	1	.
XL84-0185	CP61-039	CP72-2086	466	389	24	42	3	12
XL84-0190	CP52-068	L65-069	209	161	5	10	.	.
XL84-0193	US77-17	L65-069	412	359	34	72	10	66
XL84-0194	CP72-370	L65-069	215	188	12	49	1	7
XL84-0198	CP78-357	CP73-351	219	193	10	36	3	41
XL84-0200	L75-056	CP66-346	197	183	7	20	3	46
XL84-0201	CP72-355	CP77-407	149	110	22	94	6	85
XL84-0202	CP72-355	LCP81-030	934	774	161	97	60	96
XL84-0203	CP80-329	LCP81-030	208	179	21	85	1	7
XL84-0204	CP61-037	CP76-331	221	168	.	.	.	.
XL84-0207	CP61-039	CP80-319	496	394	.	.	.	.
XL84-0213	CP78-357	L65-069	462	363	16	20	4	19
XL84-0214	CP61-039	L78-063	444	367	18	29	6	40
XL84-0215	CP80-352	L78-063	185	172	6	18	1	10
XL84-0216	L78-035	CP62-258	440	362	24	47	12	71
XL84-0217	LCP81-005	CP62-258	217	171	21	82	8	83
XL84-0218	CP76-331	CP62-258	422	330	43	85	15	82
XL84-0219	CP70-321	CP62-258	435	335	37	74	12	72
XL84-0221	CP48-103	CP62-258	1146	927	96	74	52	88
XL84-0222	CP78-317	LCP81-030	699	637	105	95	44	95
XL84-0223	CP65-357	LCP81-030	654	572	69	86	22	80
XL84-0224	LCP81-005	LCP81-030	239	204	25	86	9	83
XL84-0225	CP70-300	LCP81-030	705	557	67	82	13	54
XL84-0226	CP81-338	LCP81-030	479	420	26	46	11	65
XL84-0228	CP69-373	CP67-412	206	156	39	98	14	97
XL84-0229	CP61-039	CP67-412	486	423	.	.	.	.
XL84-0230	LCP81-018	CP70-321	294	177	8	13	.	.
XL84-0231	CP79-318	CP70-321	962	658	39	29	22	64
XL84-0232	LCP81-005	CP70-321	135	117	1	1	.	.
XL84-0233	L80-035	CP70-321	581	273	12	7	8	42
XL84-0234	US77-17	CP70-321	418	378	33	70	8	56
XL84-0235	LCP81-015	CP70-321	954	774	50	43	9	23
XL84-0238	CP75-308	CP70-321	648	501	111	97	31	90
XL84-0239	CP67-412	CP70-321	690	600	16	10	1	0
XL84-0240	CP80-313	CP70-321	724	597	39	45	14	57
XL84-0241	CP77-411	L78-063	475	393	11	10	1	1
XL84-0242	CP69-373	L78-063	216	183	5	10	.	.
XL84-0243	CP70-330	L78-063	855	716	32	24	8	23
XL84-0244	LCP81-023	L65-069	668	541	80	91	17	68
XL84-0247	CP61-039	CP66-346	475	409	16	19	4	17
XL84-0248	CP57-614	CP62-258	216	163	15	62	1	6
XL84-0249	CP73-345	CP62-258	448	380	44	83	21	89
XL84-0250	CP52-068	CP62-258	251	187	16	57	4	48
XL84-0251	CP72-370	CP62-258	474	419	75	96	30	96
XL84-0252	L77-038	CP62-258	200	181	15	67	2	25
XL84-0254	CP80-313	LCP81-030	704	577	92	92	37	92
XL84-0256	CP72-355	CP67-412	154	154	15	82	8	92
XL84-0258	CP77-402	L65-069	574	511	29	41	18	77
XL84-0259	LCP81-015	L65-069	568	471	32	49	6	28
XL84-0260	CP78-357	CP70-321	217	186	8	23	6	72
XL84-0262	CP80-319	CP70-321	363	341	11	16	4	30
XL84-0263	CP73-345	CP77-407	220	201	26	91	3	41

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Table 4. Continued

CROSS	FEMALE	MALE	SURVIVE	OWINTER	FIRST	RKS 1	SECOND	RKS 2
XL84-0264	CP78-357	L75-002	750	642	47	56	21	73
XL84-0265	CP67-412	L75-002	405	367	18	34	1	2
XL84-0266	LCP81-005	L75-002	225	209	16	63	7	76
XL84-0267	LCP81-018	L75-002	619	450	38	54	3	8
XL84-0268	CP80-356	CP78-304	475	411	52	88	13	72
XL84-0270	CP65-357	CP72-2086	458	412	20	33	4	20
XL84-0271	CP79-318	CP72-2086	475	397	13	13	3	12
XL84-0272	CP78-317	CP72-2086	236	203	17	64	4	51
XL84-0273	CP65-357	L65-069	242	207	5	7	1	4
XL84-0274	CP66-346	CP57-614	216	141	3	4	.	.
XL84-0275	CP80-324	CP57-614	799	700	42	44	3	3
XL84-0277	CP76-351	CP70-321	140	117	6	32	4	74
XL84-0278	CP78-357	CP77-407	219	200	34	96	13	95
XL84-0279	CP70-330	L75-002	1334	1094	93	62	19	43
XL84-0280	CP72-2086	L75-002	997	775	80	71	19	56
XL84-0281	CP73-345	CP77-402	661	591	33	40	7	29
XL84-0282	CP76-351	CP77-402	452	424	19	31	6	39
XL84-0283	CP73-345	LCP81-030	695	617	63	79	6	19
XL84-0284	CP76-351	LCP81-030	616	539	56	79	6	24
XL84-0285	CP80-319	CP76-301	183	166	.	.	.	.
XL84-0286	CP80-356	CP76-301	176	156	5	14	2	31
XL84-0287	CP80-313	CP76-301	155	119	9	51	1	12
XL84-0288	CP81-338	CP76-301	827	624	93	89	28	81
XL84-0289	CP77-416	CP76-301	125	88	5	28	4	78
XL84-0290	CP73-345	CP76-301	341	267	27	70	5	44
XL84-0293	CP81-307	L75-002	932	847	39	31	2	1
XL84-0294	CP72-370	L75-002	699	608	44	56	24	81
XL84-0295	CP77-402	L75-002	1154	997	45	27	14	34
XL84-0296	L78-063	L75-002	491	420	19	26	3	11
XL84-0297	CP61-037	L75-002	679	498	35	42	7	27
XL84-0298	L80-35	L75-002	709	603	38	45	13	54
XL84-0299	CP79-332	CP75-308	482	437	61	92	15	77
XL84-0300	US77-17	CP75-308	461	421	36	69	6	39
XL84-0301	CP78-357	CP75-308	1097	982	50	36	28	68
XL84-0303	CP76-301	L65-069	173	157	.	.	.	.
XL84-0305	LCP81-012	L65-069	81	68	19	99	11	99
XL84-0307	CP72-1210	L65-069	606	465	35	50	2	3
XL84-0308	LCP81-012	CP76-301	440	376	18	29	3	13
XL84-0310	LCP81-012	CP70-321	944	680	97	86	24	68
XL84-0336	CP80-328	CP77-402	205	146	24	91	3	44
XL84-0402	LCP82-096	CP75-1082	389	278	21	46	1	2
XL84-3001	CP76-331	US77-12	486	452	49	84	6	36
XL84-3011	CP77-310	US78-20	458	433	10	8	5	29
XL84-3012	CP65-357	US78-20	496	359	24	38	8	49
XL84-3026	CP65-357	US77-10	233	151	1	0	.	.
XL84-3028	CP75-361	US77-10	241	203	25	86	4	51
XL84-3029	CP79-318	US77-10	235	182	13	48	2	18
XL84-3033	US81-2	CP81-338	250	208	8	18	2	15
XL84-3042	US79-11	CP78-304	515	459	44	75	6	33
XL84-3045	CP79-318	US79-7	491	369	20	29	1	0
XL84-3046	CP79-332	US79-7	467	414	26	48	6	37
XL84-3047	CP79-318	US80-24	442	371	19	32	3	13
XL84-3048	CP79-348	US80-24	173	161	7	29	6	81
XL84-3049	CP72-370	US80-24	109	99	6	47	3	72
XL84-3056	CP65-357	MANDALAY	249	231	.	.	.	.
XL84-3057	CP65-357	SES231	241	211	.	.	.	.
XL84-3059	CP68-413	US81-42	102	91	3	15	.	.

Table 5. List of crosses of the '85' crossing series and the performance of their progenies through the first line trial stage planted in 1987.

CROSS	FEMALE	MALE	SURVIVE	OWINTER	FIRST	RKS I
MISC			424	367	50	.
XL83-0013	CP75-1082	CP75-1082	157	113	1	0
XL83-0029	CP72-370	L83P2	619	483	24	26
XL83-0030	CP75-1091	L83P2	642	462	5	1
XL83-0062	CP74-328	CP57-614	372	337	17	36
XL83-0070	CP79-301	CP62-258	450	364	36	71
XL83-0071	CP77-310	CP62-258	161	156	14	76
XL83-0073	CP71-380	CP66-346	484	383	24	40
XL83-0083	CP74-383	CP57-614	428	425	24	49
XL83-0085	CP72-1312	CP57-614	206	177	10	38
XL83-0096	CP79-301	CP69-373	529	443	22	31
XL83-0104	CP78-317	CP76-301	483	325	10	8
XL83-0105	CP79-311	CP76-301	218	177	2	1
XL83-0116	CP72-370	L65-069	460	385	25	46
XL83-0118	CP71-1194	CP62-258	930	659	33	20
XL83-0119	CP74-383	CP72-355	599	437	6	2
XL83-0134	CP72-370	CP62-258	1237	940	57	37
XL83-0135	CP71-1194	CP72-355	1179	705	25	8
XL83-0136	CP71-1240	CP72-355	477	274	23	38
XL83-0140	CP74-383	CP70-321	1009	988	53	43
XL83-0141	CP71-380	CP77-402	169	161	2	3
XL83-0153	CP50-028	CP78-304	634	558	46	64
XL83-0155	CP43-064	CP70-321	875	690	32	22
XL83-0203	L80-040	CP62-258	435	411	31	64
XL83-0211	CP52-068	LCP81-030	884	715	38	32
XL83-0212	CP65-357	LCP81-030	1704	1413	70	30
XL83-0219	CP79-311	LCP81-030	1534	1301	46	15
XL85-0001	CP74-383	CP74-2013	211	155	1	0
XL85-0002	CP81-307	CP74-2013	214	212	16	67
XL85-0003	CP77-413	85P1	242	242	26	88
XL85-0008	CP70-321	CP72-355	212	203	4	6
XL85-0009	CP80-313	CP72-355	467	426	25	45
XL85-0010	CP78-317	CP72-355	669	669	37	48
XL85-0015	CP79-348	CP76-331	481	475	28	51
XL85-0016	CP81-307	CP57-614	234	226	5	8
XL85-0018	CP57-614	CP57-614	108	86	1	1
XL85-0021	CP52-068	LCP81-030	886	876	49	48
XL85-0022	CP74-383	LCP81-030	479	477	18	24
XL85-0023	CP79-348	CP72-355	301	264	14	37
XL85-0024	CP70-330	CP72-355	642	597	37	50
XL85-0026	CP48-103	CP70-321	236	151	.	.
XL85-0028	CP80-313	CP70-321	91	91	4	34
XL85-0031	CP80-313	CP80-323	283	246	9	18
XL85-0033	CP77-414	CP80-323	237	203	16	61
XL85-0034			.	221	10	.
XL85-0035	CP72-1312	CP72-355	445	398	23	42
XL85-0036	CP65-357	CP70-321	180	175	9	40
XL85-0040	CP80-356	LCP81-030	429	426	13	16
XL85-0042			.	573	27	.

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Table 5. Continued

CROSS	FEMALE	MALE	SURVIVE	OWINTER	FIRST	RKSI
XL85-0043	CP79-348	LCP81-030	690	634	45	59
XL85-0044	CP70-330	CP76-331	233	203	17	65
XL85-0045	CP48-103	CP76-331	189	165	12	56
XL85-0050	CP52-068	CP75-308	417	379	20	38
XL85-0058	CP74-383	LCP82-076	217	215	7	18
XL85-0059	CP77-310	LCP82-076	225	197	7	17
XL85-0074	L65-069	CP67-412	173	117	18	86
XL85-0076	CP77-414	LCP81-030	588	588	31	44
XL85-0077	CP78-357	LCP81-030	405	395	31	68
XL85-0078	LCP82-073	LCP81-030	484	425	11	9
XL85-0079	LCP82-097	LCP81-030	202	156	13	57
XL85-0080	L80-035	LCP81-030	219	195	24	88
XL85-0081	LCP82-046	LCP81-030	469	465	9	6
XL85-0082	CP80-352	CP70-321	438	348	16	22
XL85-0083	US77-17	CP70-321	451	456	20	34
XL85-0084	CP72-1210	CP70-321	221	221	21	81
XL85-0086	CP80-352	CP77-310	68	60	2	15
XL85-0087	CP80-324	CP77-310	70	70	1	4
XL85-0093	LCP81-005	CP76-331	65	65	4	55
XL85-0094	CP80-356	CP73-351	400	400	9	9
XL85-0097	CP72-370	CP73-351	440	411	23	43
XL85-0098	CP70-321	CP73-351	485	471	20	30
XL85-0099	CP61-037	CP73-351	643	388	21	19
XL85-0100	LCP82-097	CP72-2086	206	149	8	26
XL85-0101	CP71-459	CP72-2086	76	66	.	.
XL85-0103	CP65-357	CP72-2086	448	264	16	21
XL85-0103	CP65-357	CP72-2086	448	184	16	21
XL85-0104	CP75-308	CP72-2086	104	103	7	60
XL85-0107	CP78-357	CP76-331	249	227	15	53
XL85-0108	LCP82-097	CP70-321	47	33	3	57
XL85-0109	CP61-037	CP70-321	243	235	6	11
XL85-0110	CP70-330	LCP81-030	566	457	28	39
XL85-0111	CP72-370	LCP81-030	1154	656	25	8
XL85-0113	CP80-352	CP73-351	472	414	16	20
XL85-0114	CP72-1210	CP73-351	225	195	8	21
XL85-0115	LCP82-046	CP72-355	204	183	17	73
XL85-0116	CP80-313	CP75-308	96	88	3	17
XL85-0117	CP77-414	CP67-412	252	228	6	10
XL85-0118	CP75-308	CP77-310	91	73	2	9
XL85-0122	LCP81-005	CP62-258	86	86	5	51
XL85-0123	CP80-313	CP69-373	175	128	26	94
XL85-0124	CP65-357	CP69-373	144	142	11	68
XL85-0125	CP71-459	CP69-373	228	228	.	.
XL85-0126	CP74-383	CP69-373	513	488	26	41
XL85-0127	CP79-348	CP69-373	505	467	14	14
XL85-0129	CP79-332	CP73-351	708	698	29	29
XL85-0130	LCP81-005	CP73-351	522	463	16	16
XL85-0131	LCP81-012	CP73-351	204	189	11	46
XL85-0132	CP75-308	CP70-321	751	590	20	13
XL85-0134	CP80-328	CP70-321	474	415	28	52
XL85-0135	CP80-356	CP70-321	223	218	11	39
XL85-0136	LCP81-023	CP70-321	235	230	8	20
XL85-0137	CP65-357	CP67-412	113	109	10	77
XL85-0138	CP70-300	CP67-412	117	98	7	53
XL85-0139	CP70-330	CP67-412	123	89	6	39
XL85-0140	CP77-405	CP72-355	209	143	8	25

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Table 5. Continued

CROSS	FEMALE	MALE	SURVIVE	OWINTER	FIRST	RKS I
XL85-0141	LCP82-073	CP72-355	175	169	4	9
XL85-0142	CP80-351	CP74-2013	233	199	12	42
XL85-0143	CP80-356	CP74-2013	238	193	27	90
XL85-0144	CP61-037	CP76-301	217	210	7	18
XL85-0145	L65-069	CP76-301	204	153	8	27
XL85-0146	CP73-345	CP78-304	234	105	18	25
XL85-0146	CP73-345	CP78-304	234	105	18	25
XL85-0147	CP79-318	LCP81-030	688	577	37	45
XL85-0148	CP48-103	LCP81-030	453	405	18	27
XL85-0149	COLD TOL	LCP81-030	259	252	13	41
XL85-0150	CP80-328	LCP81-030	261	215	10	25
XL85-0152	LCP82-047	LCP81-030	199	199	5	12
XL85-0153	LCP81-005	LCP81-030	494	494	32	58
XL85-0154	CP77-405	LCP81-030	704	580	30	32
XL85-0156	CP76-331	85P2	444	363	5	2
XL85-0158	L75-002	85P2	69	67	4	50
XL85-0160	CP80-356	CP62-258	485	444	27	48
XL85-0161	L79-034	CP72-355	450	386	18	28
XL85-0162	CP79-332	CP72-355	537	521	35	59
XL85-0163	LCP82-033	CP72-355	261	224	12	36
XL85-0164	CP80-328	CP72-355	210	190	23	88
XL85-0165	CP79-332	CP69-1052	492	460	30	54
XL85-0167	CP72-2086	CP72-2086	55	35	3	47
XL85-0168	CP74-383	CP73-351	160	152	2	3
XL85-0169	CP79-318	CP73-351	194	178	8	30
XL85-0171	CP72-370	CP67-412	232	195	10	33
XL85-0172	CP70-321	CP67-412	181	176	11	54
XL85-0173	CP67-412	CP67-412	55	43	4	64
XL85-0175	US77-17	LCP81-030	236	236	8	20
XL85-0177	LCP82-045	LCP81-030	225	222	7	17
XL85-0178	CP80-319	LCP81-030	242	222	9	23
XL85-0180	LCP81-012	LCP81-030	240	222	27	90
XL85-0181	LCP82-064	LCP81-030	115	123	3	12
XL85-0183	LCP82-047	CP70-321	250	250	.	.
XL85-0184	LCP81-018	CP70-321	157	149	5	18
XL85-0185	LCP81-009	CP70-321	223	222	4	5
XL85-0186	CP70-330	CP77-407	147	116	14	82
XL85-0187	CP79-318	CP76-301	184	127	6	19
XL85-0188	LCP82-058	CP69-1052	202	175	10	40
XL85-0190	CP78-304	CP78-304	43	32	3	62
XL85-0192	CP62-258	CP62-258	55	43	4	64
XL85-0194	CP69-1052	CP69-1052	50	28	1	7
XL85-0196	CP65-357	CP62-258	215	186	14	58
XL85-0197	CP79-332	CP62-258	464	457	25	46
XL85-0198	CP78-317	CP62-258	200	178	17	74
XL85-0199	L82-107	CP69-373	127	114	12	81
XL85-0200	CP80-356	L75-002	381	333	6	4
XL85-0201	CP70-330	L75-002	768	632	30	27
XL85-0203	CP61-037	CP57-614	174	151	7	28
XL85-0204	L65-069	CP57-614	223	170	6	13
XL85-0205	US74-90	CP73-351	243	225	.	.
XL85-0206	CP73-345	CP73-351	140	117	7	40
XL85-0207	CP78-357	CP73-351	154	125	6	26
XL85-0208	LCP81-018	CP67-412	128	127	3	10
XL85-0209	CP70-330	CP80-323	217	175	8	23
XL85-0210	CP70-321	CP80-323	235	208	20	74

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Table 5. Continued

CROSS	FEMALE	MALE	SURVIVE	OWINTER	FIRST	RKSI
XL85-0211	LCP82-058	CP76-331	180	142	.	.
XL85-0212	CP79-332	CP76-331	223	223	20	78
XL85-0213	CP80-328	CP76-331	166	152	5	15
XL85-0214	CP80-352	CP76-301	248	234	23	81
XL85-0215	LCP82-033	CP76-301	215	188	13	53
XL85-0217	CP79-318	CP70-321	491	424	18	23
XL85-0219	LCP82-058	CP70-321	170	141	18	87
XL85-0220	CP80-351	LCP81-030	238	201	24	84
XL85-0221	LCP82-033	LCP81-030	286	223	2	0
XL85-0223	CP65-357	CP69-1052	485	458	21	33
XL85-0224	CP80-319	CP69-1052	116	105	9	68
XL85-0225	LCP82-047	CP69-1052	251	138	33	92
XL85-0225	LCP82-047	CP69-1052	251	138	33	92
XL85-0226	CP79-332	CP70-321	937	852	57	54
XL85-0227	US74-90	CP70-321	66	66	2	16
XL85-0230	CP71-441	CP70-321	506	420	13	12
XL85-0231	CP80-319	CP77-310	123	123	9	65
XL85-0232	LCP82-033	CP77-310	222	211	26	91
XL85-0233	CP73-345	LCP81-030	227	192	7	17
XL85-0234	CP79-332	LCP81-030	187	176	10	45
XL85-0235	LCP81-009	LCP81-030	225	220	8	21
XL85-0236	CP80-313	LCP81-030	162	139	4	11
XL85-0237	CP80-356	CP67-412	432	350	8	6
XL85-0238	LCP82-089	CP67-412	203	186	4	7
XL85-0239	CP71-357	CP67-412	230	174	10	33
XL85-0241	LCP82-033	CP67-412	115	103	8	62
XL85-0242	LCP82-057	CP67-412	219	195	3	3
XL85-0243	L79-034	L82-107	191	182	22	90
XL85-0244	L82-107	L82-107	50	46	5	84
XL85-0245	CP79-318	CP80-313	206	194	.	.
XL85-0247	CP70-321	CP66-346	456	427	13	14
XL85-0249	CP79-332	CP66-346	233	232	6	12
XL85-0250	CP80-356	CP66-346	218	212	5	9
XL85-0251	CP48-103	CP69-1052	186	137	7	24
XL85-0252	CP70-330	CP69-1052	188	148	35	98
XL85-0253	CP75-308	CP69-1052	252	223	20	70
XL85-0254	CP79-318	CP69-1052	205	187	17	73
XL85-0255	CP80-356	CP69-1052	243	235	18	66
XL85-0256	CP61-037	CP72-1312	257	175	13	41
XL85-0258	CP80-323	CP73-351	245	219	22	78
XL85-0259	CP71-441	CP76-301	233	210	26	89
XL85-0260	LCP82-064	CP76-301	126	120	7	48
XL85-0261	CP77-416	CP76-301	252	226	14	48
XL85-0262	CP80-351	CP76-301	249	205	24	82
XL85-0263	CP70-330	LCP82-089	230	180	6	12
XL85-0264	CP80-356	LCP82-089	230	207	.	.
XL85-0265	LCP82-089	LCP82-089	51	35	1	6
XL85-0266	CP79-318	CP72-1312	232	202	4	5
XL85-0267	CP80-356	CP72-1312	245	210	11	35
XL85-0268	CP79-318	LCP82-089	257	221	10	26
XL85-0270	CP70-330	CP66-346	193	163	4	8
XL85-0271	LCP82-064	CP70-321	89	83	4	35
XL85-0272	CP77-414	CP70-321	161	131	5	17
XL85-0274	LCP82-057	CP70-321	87	78	14	97
XL85-0278	CP70-330	CP76-301	217	179	29	93
XL85-0279	CP80-319	CP76-301	242	221	21	76

(continued next page)

Table 5. Continued

CROSS	FEMALE	MALE	SURVIVE	OWINTER	FIRST	RKSI
XL85-0280	CP80-328	CP76-301	222	225	25	90
XL85-0281	CP80-351	CP66-346	253	218	32	92
XL85-0282	LCP81-018	CP76-331	213	185	.	.
XL85-0287	LCP81-010	LCP83-133	231	206	23	84
XL85-0293	CP79-300	LCP83-152	80	73	6	67
XL85-0298	CP80-360	CP76-331	215	186	16	67
XL85-0307	CP79-348	L83-183	239	271	10	31
XL85-0310	CP82-559	LCP83-198	226	191	18	70
XL85-0311	CP79-348	LCP83-198	191	189	6	17
XL85-0313	CP81-311	L83-194	204	182	15	66
XL85-0315	LCP83-163	CP77-402	210	173	10	38
XL85-0316	CP80-360	LCP81-030	145	114	8	47
XL85-0317	CP52-068	L78-063	177	173	8	35
XL85-0318	CP82-528	L78-063	234	228	6	12
XL85-0321	CP75-1091	CP78-304	256	139	4	4
XL85-0322	CP79-348	LCP83-172	235	232	26	89
XL85-0325	LCP83-154	LCP81-030	155	50	10	57
XL85-0328	CP52-068	CP80-360	236	217	14	52
XL85-0331	LCP83-129	LCP81-030	129	124	11	75

RESULTS FROM THE 1987 INFIELD VARIETY TRIALS AT ST. GABRIEL

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Sugar Station

The 1987 sugarcane crop was exposed to a wide range of weather conditions (Table 1 and Figure 1). The winter was very mild with the last frost occuring in late March. The month of April and the entire Fall season was dry. The month of June was particularly wet.

At the St. Gabriel Research Station, infield trials are planted on two soil types (Commerce silt loam and Sharkey clay). In 1987, four trials were planted on each soil type (Table 2). An infield trial at the St. Gabriel station consists of the experimental varities of a certain assignment series along with at least three commercial varieties to be used as standards. There are at least two replications per trial. Plots are usually 16 feet long and three rows wide except for the nursery trials, which are usually 16 feet long and only one row wide.

Most of the seventeen infield variety trials at St. Gabriel were harvested during good weather conditions in 1987. There was very little lodging until the end of the harvest season, but these tests were still easily harvested. At least three commercial varieties (CP 65-357, CP 70-321, and CP 74-383) were included as standards in each trial. All trials were cut with a mechanical harvester except for the second stubble trials of the 1981 & 1982 assignment series, the plant cane trial of the 1986 assignment series, and the first stubble of the 1985 assignment series. For mechanically harvested tests, stalks per acre were estimated based on plot weights and mean stalk weights.

In 1987, the percentage of stalks broken during harvesting were estimated in five infield trials. This was done by pulling a 50 stalk sample from each plot after the trial was cut by a mechanical harvester. The number of stalks damaged during the harvesting procedure was determined from each 50-stalk sample.

For most trials, a ten stalk sample was pulled from each plot and sent to the St. Gabriel sucrose lab for analysis. Plots were then weighed with a tractor-mounted hydraulic weigh rig. In the previously mentioned tests which were not mechanically harvested, a ten stalk sample was hand-cut from each plot and sent to the sucrose lab for analysis. Yields for these tests are based on stalk counts made in August and September and mean stalk weights.

Statistical analyses were done for each trial to determine varietal differences. The results of these trials can be found in Tables 3 through 20.

Figure 1: Climate data for St. Gabriel, LA for 1987.

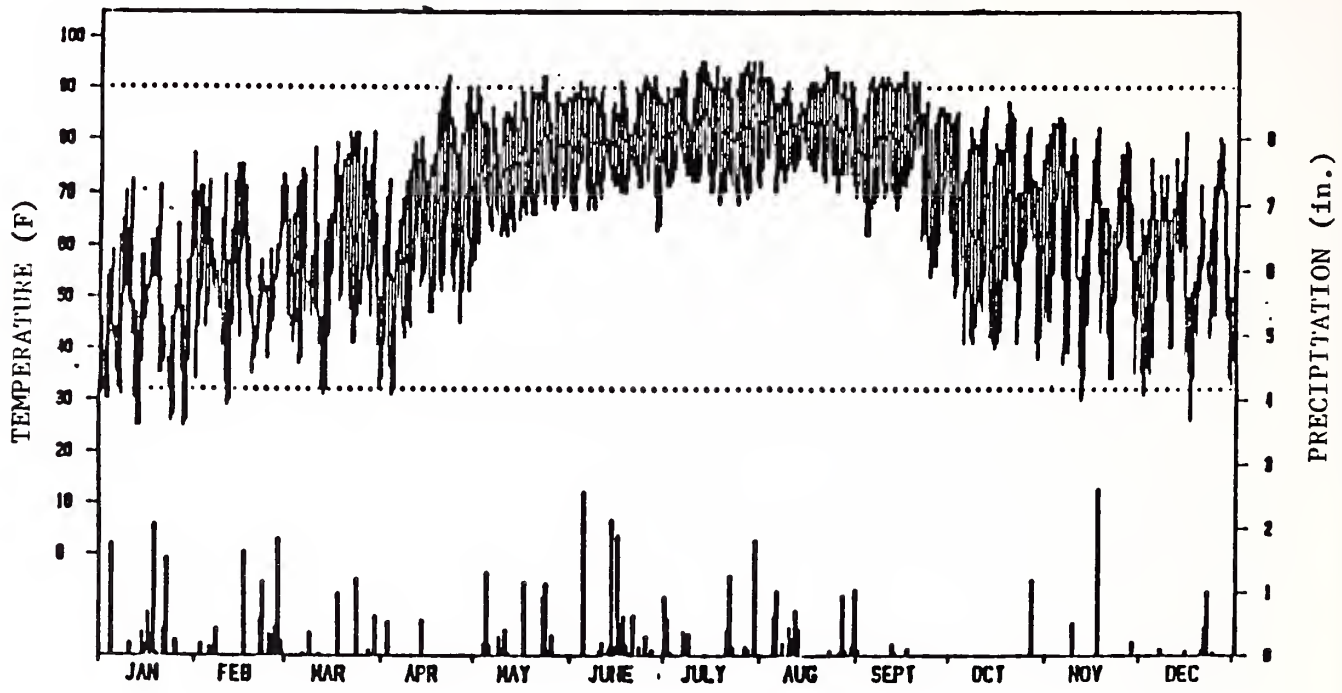

Table 1: Summary of the 1987 climatic data for St. Gabriel, LA.

	Temperature (°F)					Precipitation (in):			
MON	AVG MAX	AVG MIN	ABS MAX	ABS MIN	AVG TEMP	TOTAL	GREATEST 24-HOUR	PERCENT RAINDAYS	CUMULATIVE TOTAL
JAN	57.3	36.7	77	25	47.0	7.79	2.05	35	7.79
FEB	63.1	45.3	75	29	54.2	7.38	1.82	43	15.17
MAR	70.4	44.7	81	31	57.6	3.31	1.20	23	18.48
APR	77.6	48.7	92	31	63.2	1.08	0.55	6	19.56
MAY	86.4	66.1	92	57	76.2	6.13	1.30	39	25.69
JUN	88.0	70.4	92	63	79.2	9.66	2.55	53	35.35
JUL	91.7	71.7	95	68	81.7	6.40	1.80	42	41.75
AUG	89.8	73.7	94	69	81.8	5.99	1.03	42	47.74
SEP	88.5	66.6	93	54	77.5	0.42	0.17	13	48.16
OCT	78.7	48.0	87	38	63.4	1.18	1.18	3	49.34
NOV	72.6	47.9	84	30	60.3	4.39	3.52	13	53.73
DEC	66.3	45.1	81	26	55.7	2.25	1.00	25	55.98

NOTE: Temperature data obtained from the LSU-Ben Hur Research Farm. All data from the "Preliminary Climate Data" of the National Weather Service and Louisiana Office of State Climatology.

Table 2. Infield tests planted at St. Gabriel Research Station in 1987.

Series	Soil Texture	Planting Date
1984 L&CP	Commerce silt loam	9/4/87
1984 L&CP	Sharkey clay	9/9/87
1985 L&CP	Commerce silt loam	9/4/87
1985 L	Sharkey clay	9/11/87
1986 L	Commerce silt loam	9/18/87
1986 L	Sharkey clay	9/15/87
1987 L	Commerce silt loam	10/19/87
1987 L	Sharkey clay	10/14/87

Table 3. The 1987 Infield variety trial results from second stubble of the 1981 L & CP series on Commerce silt loam at St. Gabriel.

VARIETY	SUGAR/ ACRE (LBS)	CANE/ ACRE (TONS)	SUGAR/ TON (LBS)	STALKS ACRE (NO.)	STALK WEIGHT (LBS)	JUICE SUCROSE (%)
CP 65-357	7756	28.5	271	27072	2.09	18.5
CP 70-321	9869	34.3	288	29341	2.34	19.4
CP 74-383	11169	45.2	249	42499	2.12	17.1
LCP 81-010	11965	49.8	241	34634	2.90	16.7
LCP 81-030	11076	41.4	268	33727	2.43	18.2
CP 81-332	7913	31.4	252	29492	2.13	17.5
LSD(.05)	NS	NS	24	NS	0.49	1.4
HSD(.05)	NS	NS	47	NS	0.95	2.8

Planting date: 9/16/84 Number of replications: 3
Harvest date: 11/17/87 Plot size: 16 feet, 3 rows

Table 4. The 1987 Infield variety trial results from first stubble of the 1982 L & CP series on Commerce silt loam at St. Gabriel.

VARIETY	SUGAR/ ACRE (LBS)	CANE/ ACRE (TONS)	SUGAR/ TON (LBS)	STALKS ACRE (NO.)	STALK WEIGHT (LBS)	JUICE SUCROSE (%)
CP 65-357	7800	29.5	264	24034	2.46	18.3
CP 70-321	11883	40.8	291	35379	2.31	19.9
CP 74-383	11674	45.0	259	36539	2.49	18.0
LCP 82-046	12117	48.8	248	42093	2.34	17.4
LCP 82-058	10560	41.3	256	37951	2.19	17.9
LCP 82-073*	11597	40.5	287	28805	2.82	19.9
LCP 82-089*	9886	43.2	229	38993	2.22	16.8
CP 82-513*	10871	43.1	252	40958	2.16	17.6
CP 82-519*	11200	41.2	272	34865	2.38	18.8
CP 82-520	8862	33.3	267	26457	2.53	18.4
CP 82-537	8129	33.7	242	33033	2.05	17.1
CP 82-547	11463	40.5	284	31737	2.57	19.6
CP 82-550*	10741	38.6	279	42190	1.84	19.3
CP 82-551*	11335	40.5	280	39123	2.07	19.3
LSD(.05)	2134	6.1	35	7840	0.36	1.6
HSD(.05)	3994	11.4	65	14653	0.67	2.9

Planting date: 9/18/85 Number of replications: 2
Harvest date: 11/4/87 Plot size: 16 feet, 3 rows

*Experimental varieties still in testing program.

Table 5. The 1987 Infield variety trial results from second stubble of the 1982 L & CP series on Commerce silt loam at St. Gabriel

VARIETY	SUGAR/ ACRE (LBS)	CANE/ ACRE (TONS)	SUGAR/ TON (LBS)	STALKS ACRE (NO.)	STALK WEIGHT (LBS)	JUICE SUCROSE (%)
CP 65-357	7743	28.1	275	26771	2.11	18.8
CP 70-321	12664	45.0	279	37887	2.34	18.9
CP 74-383	11434	44.5	256	38567	2.30	17.5
LCP 82-046	13891	57.7	241	45827	2.52	16.8
LCP 82-058	10468	40.5	258	36525	2.22	17.8
LCP 82-073*	12445	46.0	271	38794	2.37	18.6
LCP 82-089*	15136	58.6	258	57851	2.03	17.9
CP 82-513*	10689	42.0	255	39021	2.16	17.6
CP 82-519*	10591	38.9	273	41063	1.89	18.7
CP 82-550*	9830	36.0	274	40609	1.77	18.8
CP 82-551*	10521	37.7	280	36299	2.08	19.1
LSD(.05)	NS	NS	28	NS	0.49	1.6
HSD(.05)	NS	NS	33	NS	0.58	1.9

Planting date: 9/17/84 Number of replications: 2
Harvest date: 11/17/87 Plot size: 16 feet, 3 rows

*Experimental varieties still in testing program.

Table 6. The 1987 Infield variety trial results from plant cane of the 1983 L & CP series on Commerce silt loam at St. Gabriel.

VARIETY	SUGAR/ ACRE (LBS)	CANE/ ACRE (TONS)	SUGAR/ TON (LBS)	STALKS ACRE (NO.)	STALK WEIGHT (LBS)	JUICE SUCROSE (%)	BROKEN STALKS (%)
CP 65-357	8231	29.6	279	21340	2.77	19.1	8
CP 70-321	9416	31.0	303	23770	2.63	20.4	25
CP 74-383	8721	31.5	276	21527	2.94	18.8	31
LCP 83-137	9957	37.4	266	29666	2.53	18.3	21
LCP 83-149	10788	35.8	302	26131	2.75	20.5	38
LCP 83-153	9212	32.1	288	24694	2.59	19.6	9
LCP 83-179	7776	28.7	272	20596	2.79	18.8	10
L 83-193	10117	36.2	280	22211	3.27	19.0	40
CP 83-606	9620	33.8	285	20778	3.26	19.5	18
CP 83-607	7615	27.6	277	18208	3.05	18.9	18
CP 83-625	11195	38.0	295	25841	2.95	19.9	30
CP 83-644	9314	31.3	298	21147	2.97	20.3	12
LSD(.05)	NS	NS	16	NS	NS	0.9	13
HSD(.05)	NS	NS	29	NS	NS	1.7	23

Planting date: 9/19/86 Number of replications: 2
Harvest date: 11/30/87 Plot size: 16 feet, 3 rows

Table 7. The 1987 Infield variety trial results from first stubble of the 1983 L & CP series on Commerce silt loam at St. Gabriel.

VARIETY	SUGAR/ ACRE (LBS)	CANE/ ACRE (TONS)	SUGAR/ TON (LBS)	STALKS ACRE (NO.)	STALK WEIGHT (LBS)	JUICE SUCROSE (%)
CP 65-357	7991	29.8	269	24364	2.45	18.6
CP 70-321	7779	26.0	300	25496	2.04	20.4
CP 74-383	10538	40.0	263	33988	2.36	18.2
LCP 83-137	10305	39.0	265	37031	2.11	18.4
LCP 83-149	9459	32.1	296	32098	2.02	20.2
LCP 83-153	10849	40.1	271	36491	2.20	18.7
LCP 83-179	8510	31.9	267	27904	2.30	18.6
L 83-193	8726	31.8	274	24543	2.58	18.7
CP 83-606	11331	39.1	290	30887	2.53	19.9
CP 83-607	8787	31.7	277	28554	2.22	19.0
CP 83-625	11324	38.9	292	40453	1.93	19.9
CP 83-644	12414	41.0	303	35686	2.31	20.7
LSD(.05)	2050	6.9	21	5639	0.24	1.3
HSD(.05)	3763	12.7	38	10350	0.43	2.4

Planting date: 9/23/85 Number of replications: 2
Harvest date: 11/5/87 Plot size: 16 feet, 3 rows

Table 8. The 1987 Infield variety trial results from second stubble of the 1983 L series on Commerce silt loam at St. Gabriel.

VARIETY	SUGAR/ ACRE (LBS)	CANE/ ACRE (TONS)	SUGAR/ TON (LBS)	STALKS ACRE (NO.)	STALK WEIGHT (LBS)	JUICE SUCROSE (%)
CP 65-357	6281	26.5	237	26238	2.02	16.6
CP 70-321	8387	30.3	277	29275	2.07	18.8
CP 72-356	5392	19.7	274	20847	1.89	18.8
CP 74-383	8908	37.1	240	33727	2.20	16.8
LCP 83-137	7331	29.9	245	31640	1.89	17.3
LCP 83-149	8339	30.6	273	32381	1.89	18.8
LCP 83-153	9037	34.4	263	33237	2.07	18.2
LCP 83-179	6694	26.5	253	33758	1.57	17.7
L 83-193	8058	29.9	270	25447	2.35	18.4

Planting date: 10/3/84 Number of replications: 1
Harvest date: 10/6/87 Plot size: 16 feet, 3 rows

Table 9. The 1987 Infield variety trial results from first stubble of the 1984 L series on Commerce silt loam at St. Gabriel.

VARIETY	SUGAR/ ACRE (LBS)	CANE/ ACRE (TONS)	SUGAR/ TON (LBS)	STALKS ACRE (NO.)	STALK WEIGHT (LBS)	JUICE SUCROSE (%)
CP 65-357	9005	30.6	294	29049	2.11	20.2
CP 70-321	11207	36.8	304	33074	2.24	20.5
CP 74-383	10766	37.7	285	34255	2.21	19.4
LCP 84-215	11687	38.4	304	41170	1.87	20.8
LCP 84-222	10136	37.8	269	29545	2.56	18.7
LCP 84-257	7811	28.9	271	21490	2.70	18.6
L 84-266	9846	33.4	296	27552	2.43	20.2
L 84-273	10095	33.8	298	29893	2.26	20.5
L 84-275	8211	28.5	289	30530	1.85	19.6
L 84-276	10500	36.8	285	32227	2.29	19.5
L 84-290	10637	36.5	293	35598	2.05	19.9
LSD(.05)	NS	NS	NS	6485	0.42	NS
HSD(.05)	NS	NS	NS	11776	0.77	NS

Planting date: 9/26/85 Number of replications: 2
Harvest date: 11/5/87 Plot size: 16 feet, 3 rows

Table 10. The 1987 Infield variety trial results from second stubble of the 1984 L series on Commerce silt loam at St. Gabriel.

VARIETY	SUGAR/ ACRE (LBS)	CANE/ ACRE (TONS)	SUGAR/ TON (LBS)	STALKS ACRE (NO.)	STALK WEIGHT (LBS)	JUICE SUCROSE (%)
CP 65-357	5611	23.3	241	21645	2.15	17.0
CP 70-321	9248	37.7	246	35662	2.11	17.2
CP 74-383	9024	42.6	212	35757	2.38	15.2
LCP 84-215	7872	28.7	274	30370	1.89	18.8
LCP 84-222	8420	39.7	212	33222	2.39	15.5
LCP 84-257	4769	22.7	210	20731	2.19	15.0
L 84-266	7935	30.6	259	32381	1.89	18.1

Planting date: 10/26/84 Number of replications: 1
Harvest date: 10/6/87 Plot size: 16 feet, 3 rows

Table 9. The 1987 Infield variety trial results from first stubble of the 1984 L series on Commerce silt loam at St. Gabriel.

VARIETY	SUGAR/ ACRE (LBS)	CANE/ ACRE (TONS)	SUGAR/ TON (LBS)	STALKS ACRE (NO.)	STALK WEIGHT (LBS)	JUICE SUCROSE (%)
CP 65-357	9005	30.6	294	29049	2.11	20.2
CP 70-321	11207	36.8	304	33074	2.24	20.5
CP 74-383	10766	37.7	285	34255	2.21	19.4
LCP 84-215	11687	38.4	304	41170	1.87	20.8
LCP 84-222	10136	37.8	269	29545	2.56	18.7
LCP 84-257	7811	28.9	271	21490	2.70	18.6
L 84-266	9846	33.4	296	27552	2.43	20.2
L 84-273	10095	33.8	298	29893	2.26	20.5
L 84-275	8211	28.5	289	30530	1.85	19.6
L 84-276	10500	36.8	285	32227	2.29	19.5
L 84-290	10637	36.5	293	35598	2.05	19.9
LSD(.05)	NS	NS	NS	6485	0.42	NS
HSD(.05)	NS	NS	NS	11776	0.77	NS

Planting date: 9/26/85 Number of replications: 2
Harvest date: 11/5/87 Plot size: 16 feet, 3 rows

Table 10. The 1987 Infield variety trial results from second stubble of the 1984 L series on Commerce silt loam at St. Gabriel.

VARIETY	SUGAR/ ACRE (LBS)	CANE/ ACRE (TONS)	SUGAR/ TON (LBS)	STALKS ACRE (NO.)	STALK WEIGHT (LBS)	JUICE SUCROSE (%)
CP 65-357	5611	23.3	241	21645	2.15	17.0
CP 70-321	9248	37.7	246	35662	2.11	17.2
CP 74-383	9024	42.6	212	35757	2.38	15.2
LCP 84-215	7872	28.7	274	30370	1.89	18.8
LCP 84-222	8420	39.7	212	33222	2.39	15.5
LCP 84-257	4769	22.7	210	20731	2.19	15.0
L 84-266	7935	30.6	259	32381	1.89	18.1

Planting date: 10/26/84 Number of replications: 1
Harvest date: 10/6/87 Plot size: 16 feet, 3 rows

Table 7. The 1987 Infield variety trial results from first stubble of the 1983 L & CP series on Commerce silt loam at St. Gabriel.

VARIETY	SUGAR/ ACRE (LBS)	CANE/ ACRE (TONS)	SUGAR/ TON (LBS)	STALKS ACRE (NO.)	STALK WEIGHT (LBS)	JUICE SUCROSE (%)
CP 65-357	7991	29.8	269	24364	2.45	18.6
CP 70-321	7779	26.0	300	25496	2.04	20.4
CP 74-383	10538	40.0	263	33988	2.36	18.2
LCP 83-137	10305	39.0	265	37031	2.11	18.4
LCP 83-149	9459	32.1	296	32098	2.02	20.2
LCP 83-153	10849	40.1	271	36491	2.20	18.7
LCP 83-179	8510	31.9	267	27904	2.30	18.6
L 83-193	8726	31.8	274	24543	2.58	18.7
CP 83-606	11331	39.1	290	30887	2.53	19.9
CP 83-607	8787	31.7	277	28554	2.22	19.0
CP 83-625	11324	38.9	292	40453	1.93	19.9
CP 83-644	12414	41.0	303	35686	2.31	20.7
LSD(.05)	2050	6.9	21	5639	0.24	1.3
HSD(.05)	3763	12.7	38	10350	0.43	2.4

Planting date: 9/23/85 Number of replications: 2
Harvest date: 11/5/87 Plot size: 16 feet, 3 rows

Table 8. The 1987 Infield variety trial results from second stubble of the 1983 L series on Commerce silt loam at St. Gabriel.

VARIETY	SUGAR/ ACRE (LBS)	CANE/ ACRE (TONS)	SUGAR/ TON (LBS)	STALKS ACRE (NO.)	STALK WEIGHT (LBS)	JUICE SUCROSE (%)
CP 65-357	6281	26.5	237	26238	2.02	16.6
CP 70-321	8387	30.3	277	29275	2.07	18.8
CP 72-356	5392	19.7	274	20847	1.89	18.8
CP 74-383	8908	37.1	240	33727	2.20	16.8
LCP 83-137	7331	29.9	245	31640	1.89	17.3
LCP 83-149	8339	30.6	273	32381	1.89	18.8
LCP 83-153	9037	34.4	263	33237	2.07	18.2
LCP 83-179	6694	26.5	253	33758	1.57	17.7
L 83-193	8058	29.9	270	25447	2.35	18.4

Planting date: 10/3/84 Number of replications: 1
Harvest date: 10/6/87 Plot size: 16 feet, 3 rows

Table 12. The 1987 Intield variety trial results from first stubble of the 1985 L series on Commerce silt loam at St. Gabriel.

VARIETY	SUGAR/ ACRE (LBS)	CANE/ ACRE (TONS)	SUGAR/ TON (LBS)	STALKS ACRE (NO.)	STALK WEIGHT (LBS)	JUICE SUCROSE (%)	FIBER (%)
CP 65-357	9495	35.1	271	28031	2.51	18.7	12.5
CP 70-321	10257	36.6	282	32064	2.28	19.3	10.7
CP 74-383	8795	37.9	232	32870	2.31	16.6	10.3
L 85-294	7990	28.9	277	25813	2.23	19.0	----
LCP 85-295	6772	24.8	272	22989	2.15	18.7	----
LCP 85-296	7534	30.6	246	32870	1.87	17.0	----
LCP 85-298*	10383	40.1	260	44567	1.79	18.1	9.6
LCP 85-307*	8643	30.6	283	31257	1.96	19.4	11.5
LCP 85-313*	9356	34.1	273	36904	1.85	18.8	11.5
LCP 85-315	9399	37.9	249	35089	2.16	17.5	----
LCP 85-316*	8621	31.8	269	34282	1.84	18.6	8.3
LCP 85-319	7491	28.7	261	24804	2.32	18.1	----
LCP 85-320	6616	24.1	275	28837	1.69	18.9	----
LCP 85-329	6714	27.4	246	25611	2.14	17.1	----
LCP 85-335	8539	32.3	265	27829	2.34	18.2	----
LCP 85-336*	11309	41.3	273	36299	2.25	18.9	12.0
LCP 85-337	7509	27.7	273	25409	2.19	18.8	----
LCP 85-340	11171	41.8	268	33072	2.53	18.4	----
LCP 85-341	7760	28.3	275	33677	1.68	19.0	----
LCP 85-344	8928	35.9	248	33274	2.15	17.5	----
LCP 85-346	6619	26.2	253	27224	1.92	17.6	----
LCP 85-347	7585	27.6	275	32669	1.68	18.9	----
LCP 85-352*	9084	35.8	255	36702	1.95	17.8	11.3
LCP 85-354	7214	30.5	237	29241	2.09	16.9	----
LCP 85-358	9735	37.7	258	30047	2.49	17.9	----
LCP 85-359	5845	20.9	280	23998	1.74	19.4	----
LCP 85-360*	9575	34.0	282	30450	2.23	19.3	9.6
LCP 85-361	8978	35.1	255	29241	2.41	18.0	----
LCP 85-369	7399	29.9	248	36702	1.63	17.5	----
LCP 85-371	7696	30.8	252	26619	2.30	17.9	----
LCP 85-373	9501	41.3	231	38517	2.14	16.6	----
LCP 85-376*	10544	37.5	282	31661	2.36	19.5	12.4
LCP 85-378	7935	28.0	283	29039	1.93	19.5	----
LCP 85-384*	13770	49.8	276	46986	2.13	19.0	11.1
LCP 85-385	7121	29.5	242	27829	2.11	17.0	----
LSD(.05)	3339	12.4	26	9646	0.33	1.5	1.4
HSD(.05)	6855	25.6	53	19804	0.67	3.1	2.5

Planting date: 10/22/85 Number of replications: 2
Harvest date: 11/4/87 Plot size: 18 feet, 1 row

*Experimental varieties still in testing program.

Table 11. The 1987 Infield variety trial results from plant cane of the 1985 L series on Commerce silt loam at St. Gabriel.

VARIETY	SUGAR/ ACRE (LBS)	CANE/ ACRE (TONS)	SUGAR/ TON (LBS)	STALKS ACRE (NO.)	STALK WEIGHT (LBS)	JUICE SUCROSE (%)	BROKEN STALKS (%)
CP 65-357	6621	24.1	275	17706	2.72	18.8	16
CP 70-321	6241	21.9	286	16469	2.71	19.4	10
CP 74-383	6930	26.2	265	18397	2.84	18.1	21
LCP 85-298	7960	30.1	264	24459	2.46	18.2	6
LCP 85-307	8525	30.0	284	23712	2.53	19.4	20
LCP 85-313	5813	23.1	252	18888	2.45	17.4	30
LCP 85-316	4900	17.1	288	17393	1.98	19.6	12
LCP 85-336	7928	29.5	269	21394	2.75	18.5	8
LCP 85-352	7418	27.4	271	23082	2.39	18.6	14
LCP 85-360	7141	24.9	287	16250	3.07	19.5	16
LCP 85-376	8593	30.9	278	23332	2.65	19.1	11
LCP 85-384	8305	29.1	286	25057	2.32	19.3	11
LSD(.05)	1797	6.6	11	4851	0.52	0.6	NS
HSD(.05)	3299	12.1	19	8903	0.95	1.2	NS

Planting date: 9/26/86 Number of replications: 2
Harvest date: 12/1/87 Plot size: 16 feet, 3 rows

Table 15. The 1987 Infield variety trial results from plant cane of the 1983 L & CP series on Sharkey clay at St. Gabriel.

VARIETY	SUGAR/ ACRE (LBS)	CANE/ ACRE (TONS)	SUGAR/ TON (LBS)	STALKS ACRE (NO.)	STALK WEIGHT (LBS)	JUICE SUCROSE (%)	BROKEN STALKS (%)
CP 65-357	8508	32.4	263	26531	2.48	18.0	17
CP 70-321	7548	26.9	280	24931	2.22	19.0	14
CP 74-383	5669	22.5	252	20331	2.24	17.3	16
LCP 83-137	7588	29.9	254	29302	2.04	17.4	21
LCP 83-149	9077	32.9	276	28079	2.37	18.9	29
LCP 83-153	7305	28.9	253	24469	2.36	17.5	10
LCP 83-179	7861	29.3	268	26511	2.21	18.5	22
L 83-193	7909	30.5	259	21875	2.81	17.7	21
CP 83-606	6763	24.8	273	18504	2.69	18.7	15
CP 83-607	6367	24.0	264	18997	2.54	18.0	7
CP 83-625	6321	21.9	289	18877	2.34	19.6	21
CP 83-644	9830	32.9	299	29218	2.24	20.2	32
LSD(.05)	NS	NS	12	NS	NS	0.8	NS
HSD(.05)	NS	NS	23	NS	NS	1.4	NS

Planting date: 8/28/86 Number of replications: 3
Harvest date: 11/20/87 Plot size: 16 feet, 3 rows

Table 16. The 1987 Infield variety trial results from first stubble of the 1983 L series on Sharkey clay at St. Gabriel.

VARIETY	SUGAR/ ACRE (LBS)	CANE/ ACRE (TONS)	SUGAR/ TON (LBS)	STALKS ACRE (NO.)	STALK WEIGHT (LBS)	JUICE SUCROSE (%)
CP 65-357	7057	25.8	274	22979	2.25	18.9
CP 70-321	9870	33.7	293	33470	2.03	20.0
CP 74-383	10775	40.1	269	32411	2.48	18.5
CP 83-137	8529	32.2	263	33800	1.88	18.3
CP 83-149	8925	31.0	288	30884	2.00	19.8
CP 83-153	8082	29.9	271	32169	1.86	18.7
CP 83-179	8161	29.2	280	30917	1.89	19.4
L 83-193	9428	34.4	274	27253	2.52	18.9
LSD(.05)	NS	NS	16	NS	0.31	0.9
HSD(.05)	NS	NS	27	NS	0.55	1.5

Planting date: 10/7/85 Number of replications: 2
Harvest date: 11/3/87 Plot size: 16 feet, 3 rows

Table 13. The 1987 Infield variety trial results from first stubble of the 1982 L & CP series on Sharkey clay at St. Gabriel.

VARIETY	SUGAR/ ACRE (LBS)	CANE/ ACRE (TONS)	SUGAR/ TON (LBS)	STALKS ACRE (NO.)	STALK WEIGHT (LBS)	JUICE SUCROSE (%)
CP 65-357	4440	18.6	237	19822	2.03	16.8
CP 70-321	7819	31.3	250	34632	1.81	17.7
CP 74-383	8268	36.7	224	36689	1.99	16.1
LCP 82-046	5247	25.5	206	21958	2.32	14.9
LCP 82-058	7652	37.0	207	44083	1.68	15.1
LCP 82-073*	7623	30.9	247	30000	2.06	17.4
LCP 82-089*	10467	41.3	253	39734	2.08	18.0
CP 82-513*	8507	36.5	233	38896	1.88	16.7
CP 82-519*	9495	41.0	231	35132	2.35	16.5
CP 82-520	8251	34.8	237	32106	2.18	16.9
CP 82-537	7629	37.7	203	42507	1.82	14.9
CP 82-547	9025	39.3	230	39049	2.04	16.5
CP 82-550*	7139	29.9	239	31399	1.90	17.3
CP 82-551*	8143	33.2	247	35610	1.86	17.6
LSD(.05)	2584	9.4	NS	13374	NS	2.0
HSD(.05)	4861	17.7	NS	25163	NS	3.7

Planting date: 9/18/85 Number of replications: 2
Harvest date: 10/9/87 Plot size: 16 feet, 3 rows

*Experimental varieties still in testing program.

Table 14. The 1987 Infield variety trial results from second stubble of the 1982 L series on Sharkey clay at St. Gabriel.

VARIETY	SUGAR/ ACRE (LBS)	CANE/ ACRE (TONS)	SUGAR/ TON (LBS)	STALKS ACRE (NO.)	STALK WEIGHT (LBS)	JUICE SUCROSE (%)
CP 65-357	6200	27.5	227	31308	1.75	16.1
CP 70-321	9012	35.1	257	36752	1.91	17.8
CP 74-383	7716	36.7	208	41592	1.75	15.2
LCP 82-046	7389	36.5	204	33576	2.20	14.8
LCP 82-058	6432	32.6	197	38340	1.72	14.4
LCP 82-073*	7831	32.3	243	32896	1.96	17.1
LCP 82-089*	9405	43.5	216	45147	1.93	15.7
LSD(.05)	NS	NS	47	13952	0.65	2.7
HSD(.05)	NS	NS	54	15982	0.74	3.1

Planting date: 9/18/85 Number of replications: 2
Harvest date: 10/7/87 Plot size: 16 feet, 3 rows

*Experimental varieties still in testing program.

Table 18. The 1987 Infield variety trial results from second stubble of the 1984 L series on Sharkey clay at St. Gabriel.

VARIETY	SUGAR/ ACRE (LBS)	CANE/ ACRE (TONS)	SUGAR/ TON (LBS)	STALKS ACRE (NO.)	STALK WEIGHT (LBS)	JUICE SUCROSE (%)	FIBER (%)
CP 61-037	9601	38.7	248	35505	2.18	17.2	13.1
CP 65-357	12376	48.4	256	42643	2.27	17.7	14.3
CP 70-321	8439	29.8	283	32391	1.84	19.3	11.3
LCP 84-215	10482	34.7	302	44230	1.58	20.6	14.3
LCP 84-222	11831	46.0	257	45320	2.03	17.8	13.1
LCP 84-257	9919	38.7	256	29542	2.62	17.7	13.5
L 84-266	11990	43.6	275	47135	1.85	18.8	14.3
L 84-273	7322	25.8	284	28508	1.81	19.5	14.1
L 84-275	6971	27.4	254	33620	1.63	17.7	13.9
L 84-276	7118	26.6	268	29721	1.79	18.4	14.4
L 84-290	7679	29.0	265	39189	1.48	18.3	12.0

Planting date: 11/15/84 Number of replications: 1
Harvest date: 10/30/87 Plot size: 16 feet, 3 rows

Table 19. The 1987 Infield variety trial results from plant cane of the 1985 L series on Sharkey clay at St. Gabriel.

VARIETY	SUGAR/ ACRE (LBS)	CANE/ ACRE (TONS)	SUGAR/ TON (LBS)	STALKS ACRE (NO.)	STALK WEIGHT (LBS)	JUICE SUCROSE (%)	BROKEN STALKS (%)
CP 65-357	8372	31.5	264	23348	2.71	18.4	11
CP 70-321	7514	26.0	289	20634	2.53	19.7	6
CP 74-383	7752	30.5	254	26054	2.37	17.6	2
LCP 85-298	8594	35.6	241	29548	2.43	16.8	3
LCP 85-307	5594	19.4	289	17824	2.20	19.7	7
LCP 85-313	7955	29.0	274	28710	2.02	18.7	5
LCP 85-316	7929	29.9	265	25385	2.35	18.4	6
LCP 85-336	9825	37.9	259	30565	2.48	17.9	2
LCP 85-352	8217	35.2	234	29965	2.35	16.4	4
LCP 85-360	8645	33.8	256	22516	3.00	17.7	3
LCP 85-376	8578	34.1	253	27828	2.44	17.6	5
LCP 85-384	9793	37.1	264	32427	2.29	18.1	5
LSD(.05)	NS	9.6	21	NS	0.39	1.2	NS
HSD(.05)	NS	17.6	38	NS	0.71	2.2	NS

Planting date: 9/18/86 Number of replications: 2
Harvest date: 11/6/87 Plot size: 16 feet, 3 rows

Table 17. The 1987 Infield variety trial results from plant cane of the 1984 L & CP series on Sharkey clay at St. Gabriel.

VARIETY	SUGAR/ ACRE (LBS)	CANE/ ACRE (TONS)	SUGAR/ TON (LBS)	STALKS ACRE (NO.)	STALK WEIGHT (LBS)	JUICE SUCROSE (%)	BROKEN STALKS (%)
CP 65-357	6932	27.2	256	23833	2.28	17.6	8
CP 70-321	7004	26.1	268	21117	2.49	18.3	28
CP 74-383	7187	29.1	248	21258	2.74	17.1	7
LCP 84-215	6226	22.9	272	21191	2.16	18.5	2
LCP 84-222	7540	33.3	227	22558	2.98	16.0	9
LCP 84-257	6922	28.2	246	17547	3.21	17.0	12
L 84-266	6691	25.2	266	18104	2.81	18.0	10
L 84-273	6026	23.1	262	18224	2.54	18.0	26
L 84-275	6659	26.1	255	30177	1.73	17.5	12
L 84-276	8429	33.3	253	25363	2.63	17.4	12
L 84-290	7727	30.7	252	24869	2.47	17.4	11
CP 84-722	6405	25.0	257	21359	2.33	17.7	26
CP 84-730	7571	28.4	267	19287	2.94	18.2	41
CP 84-738	6436	22.9	282	18836	2.43	19.2	17
CP 84-746	7604	31.2	244	25697	2.42	16.9	20
CP 84-755	6583	25.4	260	21084	2.40	17.8	22
CP 84-761	8130	30.3	268	27932	2.17	18.3	17
CP 84-772	6511	26.1	249	18770	2.77	17.2	19
LSD(.05)	NS	NS	16	6143	0.39	1.0	NS
HSD(.05)	NS	NS	30	11805	0.76	1.8	NS

Planting date: 9/25/86
Harvest date: 11/20/87
Number of replications: 2
Plot size: 16 feet, 3 rows

Table 20. (continued)

LCP 86-450	10750	44.5	242	26770	3.33	16.7
LCP 86-451	10241	39.8	259	26090	3.10	17.6
LCP 86-452	9191	39.1	235	26544	2.93	16.3
LCP 86-453	9667	37.2	261	23367	3.15	18.0
LCP 86-454	9639	38.7	249	27904	2.76	17.2
LCP 86-456	9502	34.6	275	30627	2.26	18.8
LCP 86-457	12118	55.4	218	42197	2.62	15.2
LCP 86-458	9578	45.5	212	24501	3.71	15.1
LCP 86-459	8742	38.9	224	30173	2.57	15.7
LCP 86-460	7862	32.6	242	32215	2.02	16.8
LCP 86-463	10393	40.5	256	25863	3.12	17.6
LCP 86-468	10094	40.3	251	31761	2.55	17.3
LSD(.05)	NS	NS	24	6996	0.60	1.4
HSD(.05)	NS	NS	50	14631	1.26	3.0

Planting date: 10/26/86 Number of replications: 2
Harvest date: 11/16/87 Plot size: 16 feet, 1 row

Table 20. The 1987 Infield variety trial results from plant cane of the 1986 L series on Sharkey clay at St. Gabriel.

VARIETY	SUGAR/ ACRE (LBS)	CANE/ ACRE (TONS)	SUGAR/ TON (LBS)	STALKS ACRE (NO.)	STALK WEIGHT (LBS)	JUICE SUCROSE (%)
CP 65-357	8330	30.9	271	23594	2.61	18.5
CP 70-321	8570	33.3	258	26317	2.54	17.6
CP 74-383	8796	40.5	219	28585	2.82	15.4
LCP 86-393	10021	41.0	244	33123	2.47	16.9
LCP 86-394	8755	36.3	241	26997	2.69	16.9
LCP 86-395	8444	33.7	250	30627	2.20	17.3
LCP 86-399	7596	33.6	225	25409	2.64	15.8
LCP 86-402	9063	39.8	230	24048	3.32	16.0
LCP 86-407	7510	31.8	238	27451	2.34	16.5
LCP 86-408	7783	36.1	216	29946	2.41	15.3
LCP 86-411	9528	37.1	258	29947	2.48	17.7
LCP 86-412	8318	31.9	261	23140	2.77	17.8
LCP 86-414	6810	32.5	209	24728	2.64	15.0
LCP 86-416	7064	29.7	238	24502	2.41	16.6
LCP 86-419	7762	31.7	244	25636	2.46	16.8
LCP 86-420	10513	44.7	236	38341	2.31	16.4
LCP 86-421	6603	29.5	224	27905	2.12	15.8
LCP 86-422	8123	30.9	265	18149	3.38	18.0
LCP 86-426	6228	26.3	242	22460	2.36	16.8
LCP 86-429	8977	38.8	232	26090	2.97	16.1
LCP 86-431	8267	38.6	215	28585	2.68	15.1
LCP 86-434	9755	38.9	250	31534	2.47	17.2
LCP 86-435	8453	35.2	241	21779	3.23	16.7
LCP 86-438	9801	44.1	222	28132	3.16	15.5
L 86-439	6853	36.8	187	24955	2.96	13.8
LCP 86-442	7375	34.2	216	25409	2.69	15.2
LCP 86-444	6373	30.7	206	28358	2.15	14.6
LCP 86-446	7077	32.4	218	24048	2.71	15.3
LCP 86-447	10171	43.2	236	24955	3.45	16.4
LCP 86-448	7226	32.1	226	27905	2.30	15.7
LCP 86-449	7684	33.9	227	25636	2.69	15.8

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VARIETAL EVALUATION AT THE IBERIA RESEARCH STATION

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Beginning in the fall of 1985, L and LCP assignments to the infield stage of the variety development program were planted on the Iberia Research Station near Jeanerette. The information gleaned from this additional location should enhance our ability to identify experimental varieties which possess the potential to contribute to Louisiana's sugar industry. First stubble performance of the 1985 assignments on Baldwin silty clay loam along the Bayou Teche mostly mimicked their performance at the St. Gabriel Research Station on Commerce silt loam. Of the 32 1985 L and LCP assignments, 23 were eliminated from further consideration and only nine remain in the testing program. Eighteen of the entries were dropped for smut susceptibility, the remaining five were eliminated because of low overall sugar yields.

Figure 1 on the next page shows the 1987 comparative performance of the five highest-yielding experimental clones and the average of three commercial checks in the first stubble crop at Jeanerette and St. Gabriel. Of the nine selected clones, the differential performance of LCP 85-316 is a good example of how certain clones may be specifically adapted to a location. A comparison between locations of the data for LCP 85-316 reveals that at Iberia, as an average of plant cane and first stubble crops, the clone produced 40%, 27%, 40% and 19% more pounds of sugar/acre, number of stalks/acre, tons of cane/acre and weight/stalk, respectively, than it did at St. Gabriel. Because the performance of these experimental clones is a reflection of only two replications of one planting, perhaps it is premature to herald the performance of certain of these clones at the Iberia Research Station. Additional plantings are needed to substantiate adaptation. Of course, the objectives of the infield testing at the Iberia Research Station are to expedite the identification of superior varieties and to screen for varieties specifically adapted to the soils and environment of the Teche region.

The nine selected experimental varieties in first stubble (Table 1) averaged 25%, 21% and 35% more sugar/acre, cane/acre and stalks/acre, respectively, than the average of the four commercial check entries. Minor differences can be seen for sugar/ton, stalk weight and juice sucrose.

Table 2 includes the plant cane performance of the 1986 assignments. The experimental clones averaged 1,346 pounds of sugar/acre and 8.0 tons/acre more than the commercial varieties, but 166 pounds of sugar/ton and 1.0% juice sucrose less than the commercial varieties.

Table 21. The 1987 Infield variety trial results from fiber analysis of the 1986 L series at St. Gabriel. 1/

VARIETY	FIBER (%)
CP 61-037	12.7
CP 65-357	14.1
CP 70-321	16.5
CP 74-383	12.9
LCP 86-393	14.1
LCP 86-394	11.3
LCP 86-395	14.2
LCP 86-399	15.2
LCP 86-402	12.4
LCP 86-407	15.7
LCP 86-408	11.8
LCP 86-411	14.3
LCP 86-412	11.1
LCP 86-414	12.2
LCP 86-416	13.6
LCP 86-419	14.3
LCP 86-420	13.2
LCP 86-421	13.8
LCP 86-422	14.7
LCP 86-426	15.6
LCP 86-429	15.3
LCP 86-431	13.6
LCP 86-434	13.1
LCP 86-435	13.5
LCP 86-438	12.8
L 86-439	15.2
LCP 86-442	14.7
LCP 86-444	16.2
LCP 86-446	14.0
LCP 86-447	16.4
LCP 86-448	16.0
LCP 86-449	14.5
LCP 86-450	13.4
LCP 86-451	14.3
LCP 86-452	16.0
LCP 86-453	13.6
LCP 86-454	14.2
LCP 86-456	15.1
LCP 86-457	15.0
LCP 86-458	13.9
LCP 86-459	15.0
LCP 86-460	14.7
LCP 86-463	15.1
LCP 86-468	13.8

1/ Percent fiber determined by the chip-press method. Samples were cut on November 11 and processed on November 13. Sample size consisted of five stalks. There was some borer damage present.

Table 1. The 1987 Infield variety trial results from first stubble of the 1985 L series on Baldwin silty loam at the Iberia Research Station.

VARIETY	SUGAR/ ACRE (LBS)	CANE/ ACRE (TONS)	SUGAR/ TON (LBS)	STALKS ACRE (NO.)	STALK WEIGHT (LBS)	JUICE SUCROSE (%)
CP 61-037	9923	40.4	246	30854	2.69	17.2
CP 65-357	11104	41.0	272	29720	2.75	18.8
CP 70-321	12747	44.7	285	41063	2.18	19.6
CP 74-383	11117	44.5	250	36752	2.42	17.6
L 85-294	12406	44.9	276	29493	3.04	19.1
LCP 85-295	10680	37.1	289	28585	2.57	19.8
LCP 85-296	20660	83.8	247	56943	3.00	17.3
LCP 85-298	11229	44.7	252	50591	1.77	17.7
LCP 85-307	8287	30.3	267	32669	1.83	18.5
LCP 85-313	10650	38.6	272	42424	1.80	18.8
LCP 85-315	11701	43.6	269	46507	1.91	18.6
LCP 85-316	16271	56.4	289	42651	2.65	19.9
LCP 85-319	12396	48.9	254	36299	2.66	17.8
LCP 85-320	8943	31.7	282	29946	2.14	19.5
LCP 85-329	13301	49.8	268	30627	3.24	18.5
LCP 85-335	10197	39.8	257	27905	2.86	17.8
LCP 85-336	18998	69.8	273	54675	2.55	19.0
LCP 85-337	19521	71.9	272	49003	2.97	18.7
LCP 85-340	15120	55.5	272	35618	3.12	18.7
LCP 85-341	11660	42.0	278	42197	1.99	19.1
LCP 85-344	9470	40.2	237	39248	2.01	16.9
LCP 85-346	10801	39.6	273	30173	2.59	18.9
LCP 85-347	13289	49.9	266	40382	2.48	18.5
LCP 85-352	12773	51.9	247	45827	2.32	17.4
LCP 85-354	10872	43.5	250	40382	2.16	17.7
LCP 85-358	15832	59.1	267	43785	2.68	18.5
LCP 85-359	12898	48.1	268	45600	2.11	18.7
LCP 85-360	14451	49.5	291	39021	2.54	20.0
LCP 85-361	13228	49.8	266	38794	2.57	18.5
LCP 85-369	13551	51.1	266	47869	2.14	18.5
LCP 85-371	12826	45.4	283	38113	2.38	19.5
LCP 85-373	11400	46.6	246	44012	2.10	17.3
LCP 85-376	15050	56.3	271	41744	2.73	18.9
LCP 85-378	12011	44.4	271	45147	1.97	18.8
LCP 85-384	19039	67.7	281	70101	1.93	19.3
LCP 85-385	14753	63.8	232	49003	2.61	16.4
LSD(.05)	4420	16.5	24	12365	0.59	1.4
HSD(.05)	9110	34.0	49	25486	1.21	2.8

Planting date: 11/14/85
Harvest date: 11/19/87
Number of replications: 2
Plot size: 16 feet, 1 row

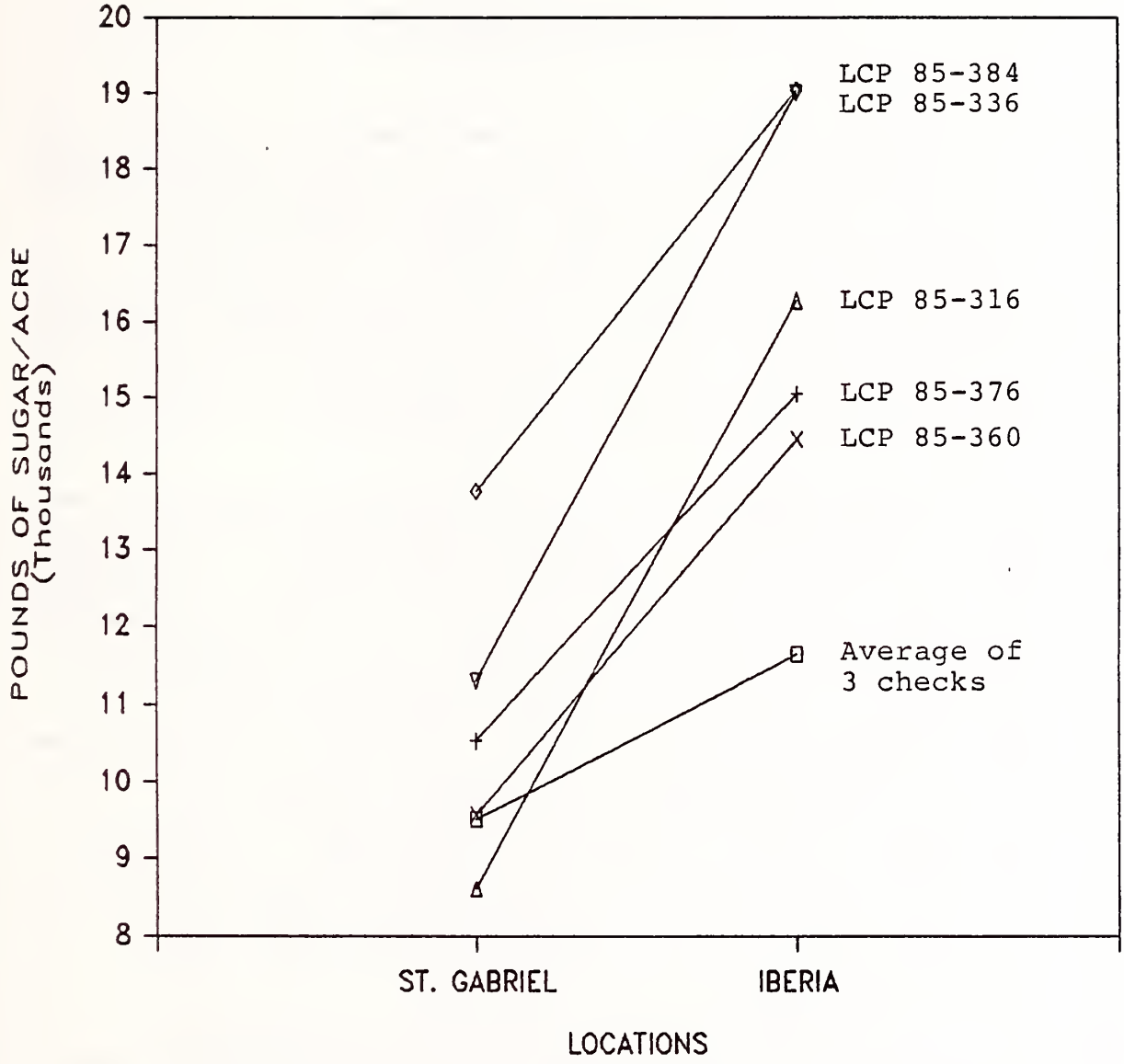

Fig. 1 - First stubble performance of highest-yielding experimental clones and commercial checks at two infield locations.

Table 2. (continued)

LCP 86-452	7605	34.7	223	31535	2.20	15.9
LCP 86-453	9819	39.3	251	24502	3.17	17.4
LCP 86-454	11206	46.0	244	27451	3.36	17.0
LCP 86-456	13288	47.1	282	39021	2.42	19.4
LCP 86-457	9036	41.3	219	36525	2.28	15.5
LCP 86-458	12472	55.2	226	34484	3.18	15.8
LCP 86-459	8736	39.3	222	30627	2.56	15.6
LCP 86-460	8926	37.8	237	34484	2.14	16.6
LCP 86-463	12115	46.9	260	30854	3.04	18.0
LCP 86-468	8972	35.4	254	29493	2.41	17.7
LSD(.05)	NS	NS	28	11595	0.61	1.6
HSD(.05)	NS	NS	58	24250	1.27	3.3

Planting date: 10/21/86
Harvest date: 11/19/87
Number of replications: 2
Plot size: 16 feet, 1 row

Table 2. The 1987 Infield variety trial results from plant cane of the 1986 L series on Baldwin silty loam at the Iberia Research Station.

VARIETY	SUGAR/ ACRE (LBS)	CANE/ ACRE (TONS)	SUGAR/ TON (LBS)	STALKS ACRE (NO.)	STALK WEIGHT (LBS)	JUICE SUCROSE (%)
CP 65-357	7194	28.0	257	21326	2.48	17.7
CP 70-321	10092	35.9	281	24275	2.96	19.2
CP 74-383	10215	43.1	236	32669	2.64	16.4
LCP 86-393	9088	37.8	243	31081	2.36	17.0
LCP 86-394	11401	43.2	265	27451	3.12	18.3
LCP 86-395	13438	52.9	254	34484	3.07	17.6
LCP 86-399	6393	25.5	251	18150	2.81	17.4
LCP 86-402	12466	52.5	238	26544	3.97	16.5
LCP 86-407	9333	40.9	228	30400	2.68	16.1
LCP 86-408	12387	49.2	252	38567	2.54	17.4
LCP 86-411	12695	49.9	256	37887	2.63	17.7
LCP 86-412	9532	37.0	257	25863	2.85	17.6
LCP 86-414	10930	45.6	241	32896	2.76	17.0
LCP 86-416	10561	43.9	241	32442	2.71	16.9
LCP 86-419	12328	47.9	257	32669	2.93	17.6
LCP 86-420	10340	40.6	255	29946	2.71	17.8
LCP 86-421	10098	45.4	222	35165	2.59	15.7
LCP 86-422	9008	38.1	238	23140	3.30	16.5
LCP 86-426	11033	46.4	237	36979	2.51	16.7
LCP 86-429	8876	38.5	230	27224	2.81	16.1
LCP 86-431	13869	60.6	230	44239	2.74	16.3
LCP 86-434	10999	44.2	252	39928	2.16	17.4
LCP 86-435	11274	48.1	234	29947	3.21	16.4
LCP 86-438	11498	51.7	226	34257	2.96	15.8
L 86-439	8607	44.1	195	30854	2.87	14.2
LCP 86-442	7996	36.8	218	31308	2.42	15.5
LCP 86-444	8330	36.1	231	29039	2.48	16.2
LCP 86-446	10628	45.9	232	30854	3.00	16.1
LCP 86-447	12898	49.4	261	27224	3.64	18.0
LCP 86-448	6676	27.6	242	23594	2.34	16.9
LCP 86-449	9895	39.9	250	25636	3.02	17.3
LCP 86-450	13361	57.2	235	35391	3.23	16.3
LCP 86-451	12398	47.2	266	32669	2.88	18.1

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Table 1a. Locations and dates of planting for the LSU outfield variety trials planted in 1987.

Locations	Planting Date	Soil Type	Soil Texture 1/
A.V. Allain & Sons	09/08/87	Baldwin silty clay	s. clay
Evan Hall	09/11/87	Sharkey clay	s. clay
Frank Pearce & Sons	09/12/87	Commerce silt loam	s. clay
Lanaux's	09/15/87	Commerce silt loam	s. loam
Glenwood	09/28/87	Commerce silt loam	s. loam
Cinclare 2/	09/29/87	Convent silt loam	v.f.s. loam

1/ s. = silty ; v.f.s. = very fine silty
2/ Seed for this test was hauled from St. Gabriel Research Station

Table 1b. Routine soil test results of 1987 LSU outfield variety test fields.

Locations	P	Na	K	Ca	Mg	pH	OM(%)
	mg/kg						
A.V. Allain & Sons	89	47	296	3657	995	5.3	2.22
Evan Hall	170	36	466	5640	1199	6.0	2.34
Frank Pearce & Sons	171	24	252	3423	711	6.0	1.76
Lanaux's	183	16	98	1289	306	5.4	0.78
Glenwood	136	38	99	1582	332	6.5	0.72
Cinclare	183	25	109	1374	234	6.2	0.91

Table 2. Varieties planted in the outfield variety trials in 1987.

Commercial varieties	Experimental varieties		Varieties introduced to outfield	
CP65-357	LCP82-073	LCP83-153	LCP84-215	CP84-722
CP70-321	LCP82-089	LCP83-179	LCP84-222	CP84-730
CP74-383	CP82-513	L83-193	LCP84-257	CP84-738
CP76-331	CP82-519	CP83-606	L84-266	CP84-746
CP79-318	CP82-550	CP83-607	L84-273	CP84-755
	CP82-551	CP83-625	L84-275	CP84-761
	LCP83-137	CP83-644	L84-276	CP84-772
	LCP83-149		L84-290	

Results from the Outfield Variety Trials Harvested in 1987[1/]

W. Dozier Lester and F. A. Martin
Sugar Station

Outfield variety testing is the final stage of the Louisiana sugarcane variety development program. In these trials, experimental varieties are evaluated along with recommended varieties under commercial farm conditions. The locations of these tests represent the soil types, managerial structures, and weather patterns of the major sugarcane producing areas of the state.

The 1987 growing season began with a wet winter and spring, followed by a dry period during the planting season. All of our outfield tests were planted in September with good support from all of the growers at each outfield location.

The outfield locations were frequently visited for various reasons throughout the growing and harvest season. Pathologists and entomologists from both LSU and USDA evaluated disease and insect pressures at the outfield locations. These data were recorded and used by the scientists in their respective disciplines to evaluate the resistance and/or susceptibility of all experimental varieties to specific crop pests.

The locations and dates of planting of the LSU outfield trials planted in 1987 are found in Table 1a. The results of routine soil tests of fields in which the 1987 outfield variety trials were planted are found in Table 1b. Five commercial and fifteen experimental varieties were planted in outfield trials in 1987 (Table 2). Of the experimental varieties, two were from the LCP 82 assignment series and four were from the LCP 83 assignment series, with one variety from the L 83 assignment series. Three replications of each variety were planted in 3 row plots 32 feet long. A randomized block design was used at each location. Fifteen experimental varieties were also introduced to the outfield in 1987. .

Harvest of the 1987 Louisiana sugarcane crop progressed exceptionally well all season long. This was due to low rainfall and absence of hurricanes. All outfield tests were harvested by the end of November.

The data obtained in 1987 for sugar per acre, sugar per ton, tons of cane per acre, stalks per acre and mean stalk weight in plant cane, first stubble, and second stubble are presented in Tables 3 through 14.

1/ The data for this report were obtained through a cooperative effort of personnel from the Louisiana Agricultural Experimental Station-LSUAC; USDA- Agricultural Research Service, Sugarcane Research Unit; and the American Sugar Cane League in accordance to the provisions of the "Three-way Agreement of 1978". The testing program would not be possible without full cooperation from the growers at each outfield location.

Table 4. The 1987 results for first stubble variety trials at Glenwood.

VARIETY	SUGAR/ ACRE (LBS)	CANE/ ACRE (TONS)	SUGAR/ TON (LBS)	STALKS ACRE (NO.)	STALK WEIGHT (LBS)
CP65-357	3287	14.7	223	17322	1.70
CP70-321 1/	5712	21.5	265	26239	1.65
CP72-356 1/	4217	15.9	265	20117	1.58
CP72-370 1/	5066	18.6	272	22667	1.65
CP74-383 1/	4862	20.9	233	24864	1.68
CP76-331	6347	22.1	287	22642	1.97
CP79-318	5050	19.1	265	23999	1.63
CP79-332	5056	19.6	258	24778	1.59
CP65-357KT 2/	4446	19.6	228	25170	1.56
LSD	663	2.9	9	5323	NS
HSD	1121	4.8	16	9004	NS

Date Planted: 10/09/85 Soil Type: Commerce silt loam
Date Harvested: 10/30/87 Harvest Condition: Good

1/ Only two replications used in analysis.
2/ KT represents Kleentek seed source of this commercial variety introduced to the test location in 1983.

Table 5. The 1987 results for second stubble variety trials at Glenwood.

VARIETY	SUGAR/ ACRE (LBS)	CANE/ ACRE (TONS)	SUGAR/ TON (LBS)	STALKS ACRE (NO.)	STALK WEIGHT (LBS)
CP70-321	4454	17.1	261	22826	1.50
CP72-356	3984	15.7	254	21178	1.50
CP72-370	4709	16.4	287	24114	1.36
CP74-383 1/	4897	22.3	220	39821	1.12
CP76-331	5522	20.5	270	28191	1.46
CP79-318	5203	19.3	270	27118	1.46
CP79-332	5044	19.5	259	25985	1.50
CP65-357KT 2/	4442	19.2	232	29427	1.29
LSD	NS	NS	20	NS	NS
HSD	NS	NS	33	NS	NS

Date Planted: 10/29/84 Soil Type: Commerce silt loam
Date Harvested: 10/22/87 Harvest Condition: Good

1/ Only one replication used in analysis.
2/ KT represents Kleentek seed source of this commercial variety introduced to the test location in 1983.

GLENWOOD

These tests (Tables 3,4,5) were harvested under good field conditions. Weed pressure in plant cane and first stubble was limited to the alleys between test plots with no weed pressure in the test plots. The second stubble plot had Johnsongrass scattered throughout the field. A one row harvester was used to cut the test in two directions. All varieties were standing and harvested well.

Table 3. The 1987 results for plant cane variety trial at Glenwood.

VARIETY	SUGAR/ ACRE (LBS)	CANE/ ACRE (TONS)	SUGAR/ TON (LBS)	STALKS ACRE (NO.)	STALK WEIGHT (LBS)
CP65-357	4498	17.6	256	18033	1.95
CP70-321	3549	14.1	251	16411	1.72
CP74-383	5132	22.2	230	20224	2.20
CP76-331	6275	23.3	269	20023	2.33
CP79-318	6178	22.9	270	18906	2.46
CP79-332 1/	5337	20.3	263	21100	1.93
LCP82-073	5275	19.7	268	16725	2.36
LCP82-089	4733	19.0	250	19207	1.99
CP82-513	5732	22.0	261	20711	2.12
CP82-519	4889	19.0	257	16642	2.28
CP82-550	4810	17.8	271	20011	1.78
CP82-551	5456	21.0	260	22075	1.92
LSD	782	3.2	14	NS	0.28
HSD	1374	5.7	24	NS	0.49

Date Planted: 10/06/86 Soil Type: Commerce silt loam
Date Harvested: 11/13/87 Harvest Condition: Good

1/ Only two replications used in analysis.

Table 7. The 1987 results for first stubble variety trials at Lanaux.

VARIETY	SUGAR/ ACRE (LBS)	CANE/ ACRE (TONS)	SUGAR/ TON (LBS)	STALKS ACRE (NO.)	STALK WEIGHT (LBS)
CP65-357 1/	3948	15.4	257	20085	1.54
CP70-321	5397	20.5	263	24014	1.71
CP72-356	4738	17.8	266	20674	1.76
CP72-370	4655	17.6	264	21799	1.62
CP74-383	6918	27.6	251	28691	1.93
CP76-331	6576	24.9	265	27473	1.81
CP79-318	5865	22.5	261	23221	1.94
CP79-332	4801	17.6	272	21750	1.63
CP65-357KT 2/	5899	24.1	245	28674	1.70
LSD	959	3.7	NS	6263	NS
HSD	1615	6.2	NS	10549	NS

Date Planted: 10/02/85 Soil Type: Commerce silt loam
Date Harvested: 11/06/87 Harvest Condition: Good

1/ Only two replications used in analysis.
2/ KT represents Kleentek seed source of this commercial variety introduced to the test location in 1983.

Table 8. The 1987 results for second stubble variety trials at Lanaux.

VARIETY	SUGAR/ ACRE (LBS)	CANE/ ACRE (TONS)	SUGAR/ TON (LBS)	STALKS ACRE (NO.)	STALK WEIGHT (LBS)
CP65-357	4876	18.3	266	21318	1.71
CP72-356	5661	19.9	284	21947	1.84
CP72-370	4285	14.3	301	18073	1.58
CP74-383	6647	24.3	273	32387	1.50
CP76-331	7370	24.6	299	28289	1.76
CP79-318	7039	24.2	291	27583	1.76
CP79-332	6354	21.5	296	24731	1.75
CP65-357KT 1/	3178	11.8	273	16091	1.45
LSD	1262	4.5	21	6024	NS
HSD	2076	7.4	35	9910	NS

Date Planted: 09/18/84 Soil Type: Commerce silt loam
Date Harvested: 10/16/87 Harvest Condition: Good

1/ KT represents Kleentek seed source of this commercial variety introduced to the test location in 1983.

LANAUX

These tests (Tables 6, 7, 8) were harvested by a two row harvester under excellent field conditions. The plant cane and first stubble tests were weed free while the second stubble test had some patches of Johnsongrass. All varietes were erect in these tests and most harvested well although CP72-356, CP79-318, and CP79-332 did leave some scrap in the first stubble test.

Table 6. The 1987 results for plant cane variety trial at Lanaux.

VARIETY	SUGAR/ ACRE (LBS)	CANE/ ACRE (TONS)	SUGAR/ TON (LBS)	STALKS ACRE (NO.)	STALK WEIGHT (LBS)
CP65-357	6321	22.6	280	22374	2.02
CP70-321	6950	25.0	278	26369	1.90
CP74-383	6932	25.4	273	24805	2.06
CP76-331	7616	26.6	287	22621	2.36
CP79-318	6507	22.8	285	22415	2.07
CP79-332	6672	22.6	296	21151	2.17
LCP82-073	6827	23.8	286	21394	2.24
LCP82-089	6148	22.6	271	23108	1.95
CP82-513	6559	23.4	280	22872	2.05
CP82-519	6753	23.3	290	22228	2.10
CP82-550	6994	23.8	294	27480	1.74
CP82-551	6284	22.6	278	22541	2.03
CP70-321KT 1/	5934	21.0	282	23858	1.77
CP65-357KT 1/	7287	25.6	284	25669	2.02
LSD	NS	2.5	NS	NS	NS
HSD	NS	4.5	NS	NS	NS

Date Planted: 09/10/86 Soil Type: Commerce silt loam
Date Harvested: 11/24/87 Harvest Condition: Good

1/ KT represents Kleentek seed source of this commercial variety introduced to the test location in 1983.

Table 10. The 1987 results for second stubble variety trials at Allain.

VARIETY	SUGAR/ ACRE (LBS)	CANE/ ACRE (TONS)	SUGAR/ TON (LBS)	STALKS ACRE (NO.)	STALK WEIGHT (LBS)
CP65-357	3117	15.2	205	24392	1.25
CP70-321	4362	17.7	247	26933	1.33
CP72-356	5046	22.1	228	29387	1.53
CP72-370	4321	17.9	241	23477	1.53
CP74-383	4969	21.7	229	32327	1.38
CP76-331	4927	19.9	248	28357	1.40
CP79-318	4931	21.1	235	26907	1.56
CP79-332	6042	25.5	237	39083	1.31
CP65-357KT 1/	4871	23.2	210	39235	1.18
LSD	781	3.5	24	7367	NS
HSD	1306	5.8	40	12323	NS

Date Planted: 10/05/84 Soil Type: Baldwin silty clay
Date Harvested: 10/16/87 Harvest Condition: Good

1/ KT represents Kleentek seed source of this commercial variety introduced to the test location in 1983.

EVAN HALL

An outfield variety test was planted this year from the 1986 seed increase plot. Due to severe yet irregular harvest damage in previous years on this Sharkey clay location, no data was taken at this location in 1987.

A. V. ALLAIN & SONS

The plant cane and second stubble tests (Tables 9 & 10) were weed free, all varieties erect and harvested well. No data was taken from the first stubble test due to inadvertant irregular malfunction of the fertilizer applicator in the test area.

Table 9. The 1987 results for plant cane variety trials at Allains.

VARIETY	SUGAR/ ACRE (LBS)	CANE/ ACRE (TONS)	SUGAR/ TON (LBS)	STALKS ACRE (NO.)	STALK WEIGHT (LBS)
CP65-357	7250	26.2	277	23546	2.23
CP70-321	6674	22.1	302	22400	1.97
CP74-383	6536	23.9	274	22149	2.16
CP76-331	7943	27.2	292	23260	2.34
CP79-318	7296	25.3	288	20227	2.50
CP79-332	8109	28.5	285	24469	2.34
LCP82-073 1/	6261	22.2	283	18015	2.46
LCP82-089	7854	29.3	268	28441	2.08
CP82-513	7141	25.9	275	22585	2.28
CP82-519	6709	23.9	281	19962	2.40
CP82-550	7404	25.3	293	25646	1.98
CP82-551	6594	22.4	295	21015	2.13
CP65-357KT 2/	7746	28.0	277	24430	2.29
LSD	1133	4.0	13	4254	0.20
HSD	2014	7.1	24	7563	0.35

Date Planted: 09/12/86 Soil Type: Baldwin silty clay
Date Harvested: 11/04/87 Harvest Condition: Good

1/ Only two replications used in analysis.
2/ KT represents Kleentek seed source of this commercial variety introduced to the test location in 1983.

Table 12. The 1987 results for second stubble variety trials at Cinclare.

VARIETY	SUGAR/ ACRE (LBS)	CANE/ ACRE (TONS)	SUGAR/ TON (LBS)	STALKS ACRE (NO.)	STALK WEIGHT (LBS)
CP65-357	3440	13.5	255	19876	1.38
CP70-321	3928	14.7	267	20836	1.42
CP72-356	3364	12.8	258	19663	1.28
CP72-370	5357	19.0	283	28316	1.34
CP74-383	4392	18.0	248	27610	1.31
CP76-331	5340	19.2	278	24214	1.60
CP79-318	5035	18.4	273	26632	1.40
CP79-332	4159	15.0	276	23016	1.31
CP65-357KT 1/	4755	19.9	239	28444	1.41
LSD	NS	NS	17	NS	NS
HSD	NS	NS	28	NS	NS

Date Planted: 10/03/84 Soil Type: Convent silt loam
Date Harvested: 10/28/87 Harvest Condition: Good

1/ KT represents Kleentek seed source of this commercial variety introduced to the test location in 1983.

FRANK PEARCE & SONS

These tests were cut early in the harvest season. The plant cane and first stubble tests (Tables 13 & 14) were cut under dry field conditions with a one row harvester cutting in two directions. The alleys had moderate weed pressure of Johnsongrass and Itchgrass but test plots had very little weed pressure within them. All varities were erect and both tests harvested well.

CINCLARE

Due to an inadvertant mechanical malfunction of a spray rig in the plant cane test area, data was not gathered from the plant cane test this year. The first and second stubble tests (Table 11 & 12) were harvested during damp soil conditions by a one row harvester cutting the field in two directions. There was moderate weed pressure by Johnsongrass throughout the fields. All varieties still in the program were erect and harvested well.

Table 11. The 1987 results for first stubble variety trials at Cinclare.

VARIETY	SUGAR/ ACRE (LBS)	CANE/ ACRE (TONS)	SUGAR/ TON (LBS)	STALKS ACRE (NO.)	STALK WEIGHT (LBS)
CP65-357	4742	18.1	262	21818	1.69
CP70-321	4793	17.5	276	21888	1.61
CP72-356	4749	17.5	271	21514	1.64
CP72-370	5491	20.1	273	25902	1.55
CP74-383	6984	29.2	240	33323	1.76
CP76-331	5841	21.5	273	24128	1.79
CP79-318	6743	25.6	264	29347	1.77
CP79-332	4907	18.1	271	21629	1.67
CP65-357KT 1/	6455	27.8	232	32041	1.77
LSD	1110	4.2	20	7466	NS
HSD	1863	7.1	33	12529	NS

Date Planted: 09/25/85 Soil Type: Convent silt loam
Date Harvested: 10/28/87 Harvest Condition: Good

1/ KT represents Kleentek seed source of this commercial variety introduced to the test location in 1983.

CHARACTERIZATION OF OUTFIELD TEST AT HARVEST

W. Dozier Lester and F. A. Martin
Sugar Station

The harvestability of a sugarcane variety in Louisiana is affected by the erectness and the brittleness of the variety in interaction with the conditions under which it was grown and is harvested (weather, row profile, type and condition of the harvester, and skill of the harvester operator). The harvestability of experimental varieties can be observed under a wide range of conditions in the outfield stage of the variety testing program. The suitability of an experimental variety to mechanical harvesting can best be assessed if the condition during harvesting and the harvestabilities of standard varieties in the test field are documented along with the harvestability of the experimental variety.

In 1986 we initiated the process of documenting the particulars of each outfield location. As part of the overall process, the condition of the test field is documented at the time of harvest. As can be seen on the characterization form (Figure 1), the weather, surface water status, etc., are subjectively characterized. As the test field is cut, the outfield agronomists[1/] note the erectness (or lack of) of each variety for which yield data will be taken. After the test field is cut, the heap row for each variety is subjectively rated for scrappiness.

The data in tables 1, 2, and 3 represents the number of locations in which each variety was rated in each category with regards to pre-harvest erectness and post-harvest scrap. It should be noted that 1987 was considered a good harvesting year. It can be seen that even in a good harvesting year some varieties do not harvest well under certain conditions. An accumulation of this data will allow for better characterization of varietal suitability to mechanical harvesting under Louisiana conditions.

1/ The data for this report were obtained through a cooperative effort of personnel from the Louisiana Agricultural Experimental Station-LSUAC; USDA- Agricultural Research Service, Sugarcane Research Unit; and the American Sugar Cane League in accordance to the provisions of the "Three-way Agreement of 1978". The testing program would not be possible without full cooperation from the growers at each outfield location.

Table 13. The 1987 results for plant cane variety trials at Frank Pearce and Sons.[1/]

VARIETY	SUGAR/ ACRE (LBS)	CANE/ ACRE (TONS)	SUGAR/ TON (LBS)	STALKS ACRE (NO.)	STALK WEIGHT (LBS)
CP65-357	6608	27.9	237	25893	2.16
CP70-321[2/]	6422	25.1	256	27103	1.87
CP74-383	6317	29.0	218	29341	1.99
CP76-331	6423	25.9	248	25562	2.04
CP79-318	6680	25.7	260	25625	2.01
CP79-332	5966	24.8	241	24944	1.99
LCP82-073	6461	27.5	235	25488	2.17
LCP82-089	7454	30.9	242	30883	2.01
CP82-513	7363	29.7	249	25920	2.30
CP82-519	6564	27.3	242	25957	2.10
CP82-550	6890	25.6	270	26802	1.91
CP82-551	6561	24.6	266	27736	1.78
LSD	652	2.1	20	3174	0.21
HSD	1146	3.7	36	5580	0.38

Date Planted: 09/11/86 Soil Type: Sharkey clay
Date Harvested: 10/13/87 Harvest Condition: Good

1/ The entire test was treated with a ripener.
2/ Only two replications used in analysis.

Table 14. The 1987 results for first stubble variety trials at Frank Pearce and Sons.

VARIETY	SUGAR/ ACRE (LBS)	CANE/ ACRE (TONS)	SUGAR/ TON (LBS)	STALKS ACRE (NO.)	STALK WEIGHT (LBS)
CP65-357	5070	25.4	200	30629	1.66
CP70-321	6541	26.6	246	30785	1.74
CP72-356[1/]	4764	18.4	259	22109	1.67
CP72-370	6478	26.5	244	29277	1.81
CP74-383	6259	31.7	197	37824	1.70
CP76-331	6461	27.5	236	30285	1.82
CP79-318	6610	29.9	221	32917	1.82
CP79-332	6707	29.2	230	33733	1.73
LSD	890	2.9	17	4905	NS
HSD	1472	4.9	27	8106	NS

Date Planted: 11/21/85 Soil Type: Light
Date Harvested: 10/13/87 Harvest Condition: Good

1/ Only two replications used in analysis.

Table 1. Summary of 1987 plant cane outfield harvestability evaluations at eleven locations.

	PRE-HARVEST ERECTNESS				POST-HARVEST SCRAP		
VARIETY	ERECT	LEAN	OPEN	LODGE	NONE	LITTLE	MUCH
CP 65-357	9*		1	1	11		
CP 70-321	10	1			10	1	
CP 74-383	10		1		9	2	
CP 76-331	10			1	8	1	2
CP 79-318	9	1		1	8	2	1
CP 79-332	10			1	7	2	2
CP 82-513	8		1	2	9	1	1
CP 82-519	9	1		1	7	1	3
CP 82-550	7		2	2	9	1	1
CP 82-551	9	1		1	7	4	
LCP 82-73	7	3	1		9	1	1
LCP 82-89	8	1	1	1	11		

* The data is the number of locations in which the variety was rated in the designated category.

Table 2. Summary of 1987 first ratoon outfield harvestability evaluations at eleven locations.

	PRE-HARVEST ERECTNESS				POST-HARVEST SCRAP		
VARIETY	ERECT	LEAN	OPEN	LODGE	NONE	LITTLE	MUCH
CP 65-357	9*	1			10		
CP 70-321	10				10		
CP 74-383	10				10		
CP 76-331	9			1	9		1
CP 79-318	10				9	1	
CP 79-332	8	1		1	7	3	

* The data is the number of locations in which the variety was rated in the designated category.

CHARACTERIZATION OF OUTFIELD TEST AT HARVESTING (1987)

LOCATION _____ CROP _____ TEST ID _____ DATE _____

SOIL MOISTURE CONDITION

- ☐ Dry
- ☐ Damp
- ☐ Wet
- ☐ Saturated (Standing water)
- ☐ Saturated and Raining

ROW CONDITION

- ☐ Normal
- ☐ Low profile (unable to layby)
- ☐ Rutted

WEED PRESSURE

- ☐ Weed free
- ☐ Weeds in allies only
- ☐ Some weeds throughout field
- ☐ Patches that are very weedy
- ☐ Very weedy throughout

WEED SPECIES

Moderate	Heavy	
☐	☐	Johnsongrass
☐	☐	Itchgrass (Raoulgrass)
☐	☐	Browntop Panicum
☐	☐	Bermudagrass
☐	☐	tie-vine (any species)

CANE ERECTNESS

- ☐ Everything erect
- ☐ Few varieties lodged
- ☐ Few varieties erect
- ☐ Everything lodged (random direction)
- ☐ Everything lodged (one direction)

HARVESTER

- ☐ One row harvester
- ☐ Two row harvester
- ☐ Field cut in one direction
- ☐ Field cut in two directions

ASSESMENT OF HARVESTING

- ☐ All cane on the heap
- ☐ Some varieties scrappy
- ☐ Most varieties scrappy
- ☐ All varieties scrappy
- ☐ No visible damage to stubble
- ☐ Stubble shattered (Not clean cut)
- ☐ Pulled up stubble

VARIETIES	Appearance of the Variety before Cutting: ERECT	LEANED	OPENED	LODGED	Did the Variety Make it to the Heap Row: NO SCRAP	LITTLE SCRAP	MUCH SCRAP	NO CANE ON HEAP
CP 65-357								
CP 70-321								
CP 72-356								
CP 72-370								
CP 74-383								
CP 76-331								
CP 79-318								
CP 79-332								
CP 82-513								
CP 82-519								
CP 82-550								
CP 82-551								
LCP 82-73								
LCP 82-89								
_____								
_____								
_____								

GENERAL COMMENTS:

Figure 1. The form used to document harvest conditions and varietal harvestability in 1987.

Sucrose Lab Activities - 1987 Harvest Season

Eugene LeBlanc, Jr. and F. A. Martin
Sugar Station

During the 1987 harvest season, a total of 4648 samples were processed at the St. Gabriel Sucrose Laboratory. Of this total, there were 4624 sugarcane samples and 24 sorghum samples. In order to determine percent fiber, 119 sugarcane samples were run by the press analysis. The remainder were run through the roller mill by the St. Gabriel sucrose laboratory.

Table 1 presents a breakdown of the number of sugarcane and sorghum samples processed for each specific department.

For the second year an IBM Personal Computer was used in our laboratory analysis work in 1987. The system has improved the efficiency of data generation and storage in our laboratory.

Table 1. Number of sugarcane and sorghum samples processed at the St. Gabriel Sucrose Laboratory during the 1987 harvest season.

Program Area	Number of samples	
	Sugarcane	Sorghum
Cooperative Extension Service	43	-
Cultural Practices and Fertility	511	24
Entomology	159	-
Plant Pathology	226	-
Variety Development*		
Genetic Studies	2304	-
Selection	668	-
Infield	713	-
Total	4624	24

* Samples From the Outfield Locations Are Processed at the USDA Laboratory at Chacahoula.

Table 3. Summary of 1987 second ratoon outfield harvestability evaluations at eleven locations.

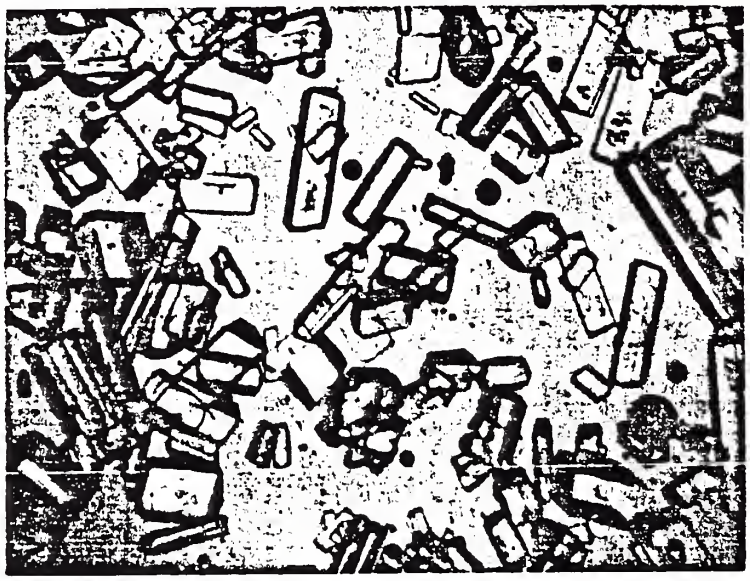
	PRE-HARVEST ERECTNESS				POST-HARVEST SCRAP		
VARIETY	ERECT	LEAN	OPEN	LODGE	NONE	LITTLE	MUCH
CP 65-357	9*	1			10		
CP 70-321	9	1			10		
CP 72-356	10				10		
CP 72-370	9	1			10		
CP 74-383	10				10		
CP 76-331	9	1			10		
CP 79-318	10				10		
CP 79-332	9	1			9	1	

* The data is the number of locations in which the variety was rated in the designated category.

FIGURE 1

SUGAR CRYSTALS FROM A DEXTRANASE TREATED AND CONTROL A STRIKES

1



2

1. Sugar from the control, note the needle grain
2. Sugar from test

Dextranase Research

Donal F., Day
Audubon Sugar Institute

We had previously developed a method for producing dextranase from a food yeast, Lipomyces starkeyi . Unlike currently available commercial dextranases, this enzyme has a good chance for FDA approval. This year reseach concentrated on production of dextranase in sufficient quantity to test the efficacy of this enzyme in pilot scale removal of dextran from mixed juice.

Two 500 l runs were required to make sufficient enzyme for the test , as well as to prototype the enzyme production system. They could both be termed moderately successful, about 25 x 10^6 International units of enzyme were produced. This was sufficient enzyme for the pilot study as well as the required laboratory experiments. For the mill trial, three tons of sugarcane were obtained from the St. Gabriel sugar station and this was processed to make 500 gal of mixed juice. The mixed juice was split into a control and a test fraction. To the test was added sufficent dextran to produce a level of 10,000 ppm on Brix. Enzyme at the level of 0.28 IU/ml was added to the test sample. Both lots of juice were allowed to stand at ambient temperature for one hour (samples were withdrawn over the course of this period to monitor dextran removal) before clarification. Both lots of juice were treated identically to produce A strike sugar. The untreated sample was almost impossible to boil and couild not be adequately purged. the small amount of sugar that could be recovered was both dark in color and needle grained. The dextranase treated material boiled normally and the sugar produced was both square and light in colr (Figure 1). the analysis of the various materials atre shown in Table 1, unless otherwise noted all analyses were by the ASI II dextran method. On a smaller scale, tests were made as to the effects of juice concentration and temperature on the removal of dextran from mixed juice.

We feel this project has reached the point where full scale trials at a commercial mill should be tried and commercialization of the process investigated.

PURIFICATION OF SUGARCANE PROCESS STREAMS

Stephen J. Clarke
Audubon Sugar Institute

Objectives

1. To develop flexibility in procedures for cane juice clarification.
2. To determine the impact of varying clarification conditions upon subsequent processes, especially filtration and evaporation.
3. To develop methods for purification and quality enhancement for syrup and molasses.

Summary

Data for both factory and laboratory studies of purification and recovery processes for sugar have been acquired. Factory studies have centered on physical losses and purity drops at the filter station and on developing methods for determination of levels of suspended (insoluble) solids in all process streams. Data suggest that the losses are greater than usually estimated by the factory laboratory. A good correlation was found between directly determined pol % filter cake and the value calculated from the brix of the residual juice in the cake and the cake moisture.

Laboratory studies have been of two aspects of sugar purification (i) factors controlling primary juice purification and (ii) improved methods of sugar purification and recovery by crystallization from mixed solvent systems.

Polymeric flocculants (usually partially hydrolyzed polyacrylamides and anionic) one standard in the sugar industry. This study has involved the evaluation of other anionic polymers (carboxylate or sulfonate) or cationic polymers (quaternary amines or of indeterminate structure). The carboxylate polymers showed little advantage over standard polyacrylamides. The sulfonate polymers were of insufficiently high molecular weight to enhance flocculation but did show some promise as a means of decreasing the concentration of free calcium ions in solution.

The cationic polymers (polybrene, hydroxyethylated polyethylenimine, polyethylenimine and polydiallyldivinylammonium chloride) all confirm the potential of polyamines for improved clarification and color removal. The latter two showed most promise and are being investigated further.

Clarification of refractory juices (e.g. from deteriorated cane) have been investigated using natural and synthetic materials as model systems. These materials are expected to interfere with the colloidal properties of the system and to therefore produce conditions which mimic those found with refractory juices. The materials used include anionic, cationic, zwitterionic and non-ionic surfactants; proteins, starch, lecithin and related phopholipids and humic acid. Cationic surfactants tend to improve clarification, whereas long chain alkane sulphonates have an adverse effect, as do lecithin and humic acid.

TABLE 1

DEXTRAN REMOVAL FROM MIXED JUICE BY LIPOMYCES DEXTRANASE

(Dextran as ppm/Brix)

SAMPLE	UNTREATED	TREATED
MIXED JUICE	10052	10052
CLARIFIED	10754	6028
SYRUP	10540	5714
SUGAR	3626	1714
SUGAR BY HAZE TEST	2240 MAU	540 MAU

Data from mill test showing the removal of dextran from mixed juice by Lipomyces dextranase, with the consequent lowering of the dextran in sugar. Haze test values are reported as milliabsorbance units (MAU). All dextran analyses, except where noted as done by the haze test were ASI II values

COMPOSITION OF LOUISIANA FINAL MOLASSES

Michael SASKA
Audubon Sugar Institute

Since little inorganic material introduced into a sugar factory is eliminated in clarification or crystallization processes, these compounds accumulate and leave the factory in final molasses. Thus the composition of molasses is closely related to the composition of sugarcane and to some extent composition of the soil. In addition, its composition, or more specifically, the ratio of concentrations of sucrose and non-sucrose components (which is proportional to purity) is an essential criterion of factory performance.

A total of 31 samples was analyzed with, mostly, two samples for each factory that participated in the survey. The composite samples # 1 covered approximately the time span between October 12 through November 12, i.e. the first half of the grinding season, while the samples # 2 were taken from November 13 through the end of the season, i.e. around December 15. The sampling was done so that the composites represent an average over the sampling period.

In order to allow for direct comparison of the results among samples, the results are given in per cent of true dissolved solids throughout this report. Thus sucrose content is identical with true purity and these two terms are used interchangably unless specified otherwise.

RESULTS

The true purity (TABLE I) varied from 39.8 to 50.8, a similar range as found in previous surveys. The invert sugar content (fructose + glucose) ranged from 8.9 to 18.2 % TDS, conductivity ash from 12.4 to 16.4 % TDS. The reducing sugar/ash ratio, a significant parameter with a strong effect on molasses exhaustion, ranged from .53 to 1.44. Dextran content was relatively low, from about .2 to .6 %TDS or 2000 to 6000 ppm.

As expected, potassium is the major cation component (TABLE II) followed by calcium, magnesium, sodium and iron in trace quantities. The relative variations in potassium content are rather small among the individual samples (factories). A significant difference though exists between the mean compositions of samples # 1 and # 2, i.e. the first and second halves of the season respectively. In particular, the (glucose+fructose)/ash ratio decreased from 1.06 in the first half of the season to 0.76 in the second half. This effected exhaustion, the mean sucrose content (true purity) being 44.5 and 46.4 respectively in the first and second half of the season. This is consistent with the results of the 1985 and 1986 surveys and is probably related to the crop maturity and harvesting schedule. The reducing sugars content (glucose + fructose) is significantly lower than in the preceeding surveys and a large part of this difference is probably attributable to the previously used chemical method (Lane-Eynon titration) for reducing sugars. The amount of copper-reducing non-sugar components in sugarcane final molasses was found (1) to be up to 4 grams per 100 grams of molasses and these would be characterized as reducing sugars by the chemical method.

The solubilities of sucrose and invert sugars have been determined for a series of solvents, particularly those involving aqueous/glycol derived systems. On a small scale better crystalline sugar recovery was achieved with a single stage boiling system using propylene glycol than could be achieved with a conventional boiling system.

TABLE I: Analyses of 31 samples of final molasses. suc=sucrose (true purity), glu=glucose, fru=fructose, ash=conductivity ash, rs/ash=reducing sugars/ash ratio, dex=dextran. All in % total dissolved solids.

NAME	SUC	POL	GLU	FRU	ASH	RS/ASH	DEX
A-1	47.2	43.6	4.9	7.4	12.6	0.97	0.51
A-2	50.8	47.6	3.1	6.1	13.6	0.68	0.53
B-1	42.9	37.5	5.5	8.3	12.7	1.08	0.51
B-2	47.0	42.9	3.9	7.6	14.4	0.79	0.38
C-1	46.0	41.3	5.0	8.8	13.3	1.04	0.48
C-2	45.2	41.7	4.3	7.5	13.8	0.85	0.57
F-1	42.7	36.2	4.2	8.6	14.0	0.91	0.50
F-2	45.0	42.5	3.2	5.8	17.0	0.53	0.34
G-1	45.9	41.2	4.5	8.1	13.0	0.97	0.43
G-2	45.1	40.6	3.8	7.5	14.3	0.79	0.52
H-2	44.6	41.4	4.8	7.3	15.8	0.77	0.50
I-1	39.8	32.4	7.2	11.0	12.7	1.44	0.55
I-2	42.9	38.5	5.3	7.6	16.4	0.78	0.43
J-1	45.2	39.5	5.7	9.6	12.4	1.24	0.35
J-2	45.5	42.1	4.1	7.6	13.4	0.87	0.36
K-1	44.1	37.8	4.3	8.5	15.0	0.86	0.34
L-1	44.5	37.8	6.9	10.1	13.9	1.22	0.44
N-1	42.8	37.6	3.6	8.7	13.4	0.92	0.73
O-1	46.7	41.4	4.9	8.8	12.2	1.13	0.58
P-1	44.9	39.1	6.0	9.4	13.2	1.17	0.38
P-2	48.4	43.0	4.0	7.6	14.3	0.82	0.40
Q-1	44.1	39.1	4.6	8.3	13.6	0.94	0.34
Q-2	47.6	43.4	3.4	7.0	14.7	0.71	0.50
R-1	44.1	38.2	5.3	9.5	12.2	1.20	0.42
R-2	45.2	40.9	3.7	7.9	14.7	0.79	0.33
S-1	43.5	37.3	5.6	9.7	13.7	1.11	0.39
S-2	47.0	41.9	3.5	6.9	15.6	0.67	0.56
T-1	43.4	38.8	4.2	8.6	14.1	0.91	0.45
T-2	45.8	42.0	2.9	6.0	15.8	0.56	0.52
W-1	48.5	41.9	3.0	8.0	13.0	0.84	0.39
W-2	49.8	42.0	4.5	8.2	13.0	0.98	0.21

A formula previously derived at ASI (2) for the so called target true purity

target true purity = 42.4 - 12.5 log10 (RS/ASH)

for Louisiana conditions allows evaluation of factory performance in terms of approach to the target value. In TABLE III, the samples (factories) are arranged according to the difference

dif = true purity - target true purity

This varies from -.8 to 7.3. Obviously, negative values represent true purity of final molasses below the target value and this is by no means a contradiction in terms since the target, as defined here, represents merely an expected result under conditions of good factory practice. Cases of exceptionally good low-purity work and possibly, to a lesser degree, variations in composition of the ash component away from the Louisiana average may result in negative values of the difference. Contrary to the sucrose, glucose + fructose and ash contents, no systematic difference exists between samples # 1 and # 2 as far as exhaustion of final molasses is concerned. This indicates that the approach to the target value is a quantity dependent mainly on the factory practice and not on molasses composition. Because of the time-variable composition, the mean target purity was 42.2 and 44.0 for samples # 1 and #2 respectively.

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Increasing Sugar Recovery of Low Grade Massecuites

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Audubon Sugar Institute

Introduction:

Between 1980 and 1985 Audubon Sugar Institute conducted an annual final molasses analysis survey at all of the Louisiana sugar factories. This study indicated that the true purity of the Louisiana final molasses was about 5 to 8 purity points above the target purity.

Additional surveys have indicated some of the practices causing the high final molasses purities.

In this study, it was decided to concentrate on one factory where it was possible to monitor and control the processing steps to determine what could be done with existing equipment.

Method:

Details on the operating conditions and material analyses were obtained throughout the low grade station. Operating conditions monitored included graining, strike boiling, massecuite flow and cooling, and operation of the centrifugals.

All low grade materials were analyzed on a daily basis for apparent purity. Final molasses composites were also analyzed for reducing sugars, sulfated ash content, and percent of true sucrose. This data enabled calculation of true and target purities.

Temperatures were also recorded throughout the low grade station, beginning with strikes as dropped, massecuite in both crystallizers, mixer, and into the centrifugals.

Although much attention was focused on grain, "C" strike, and magma purities, the major emphasis was placed on the temperature to which "C" massecuites were cooled.

In early October, crystallizer temperatures ranging from 117-125°F were recorded. Cooling was then increased, with temperatures dropping to an average of 95-100°F in December.

Results:

Table 1 shows that as cooling increased the difference between true and target purities decreased.

TABLE II: Ash and cation analysis of final molasses. All in % total dissolved solids.

NAME	ASH	K	NA ppm	CA	MG	FE ppm
F-2	17.0	•	•	•	•	•
I-2	16.4	•	•	•	•	•
H-2	15.8	•	•	•	•	•
T-2	15.8	5.85	623	0.890	0.707	163
S-2	15.6	4.97	1156	0.762	0.841	69
K-1	15.0	5.51	534	0.811	0.574	125
Q-2	14.7	5.18	1714	0.642	0.508	78
R-2	14.7	6.14	770	0.833	0.491	121
B-2	14.4	5.85	264	0.765	0.448	75
G-2	14.3	5.71	415	0.720	0.493	109
P-2	14.3	5.41	344	1.091	0.614	143
T-1	14.1	5.11	550	0.741	0.534	157
F-1	14.0	5.32	466	0.721	0.594	123
L-1	13.9	4.80	978	0.773	0.641	106
C-2	13.8	5.37	450	0.798	0.463	104
S-1	13.7	4.33	1036	0.719	0.672	77
A-2	13.6	5.89	506	0.775	0.425	102
Q-1	13.6	5.67	1234	0.641	0.467	87
J-2	13.4	4.57	430	0.682	0.585	97
N-1	13.4	4.95	769	0.627	0.529	130
C-1	13.3	5.65	420	0.645	0.379	77
P-1	13.2	5.38	378	0.869	0.507	143
G-1	13.0	5.52	531	0.596	0.398	86
W-1	13.0	4.45	1726	0.657	0.598	118
W-2	13.0	•	•	•	•	•
B-1	12.7	5.09	374	0.686	0.391	70
I-1	12.7	4.18	822	0.652	0.522	134
A-1	12.6	5.06	491	0.655	0.365	84
J-1	12.4	4.53	369	0.639	0.528	126
D-1	12.2	5.28	2114	0.362	0.295	77
R-1	12.2	4.80	628	0.682	0.363	109

NAME	SUC	TARG	DIF
F-2	45.0	45.8	-0.8
I-2	42.9	43.7	-0.8
I-1	39.8	40.4	-0.6
F-1	42.7	42.9	-0.2
N-1	42.8	42.9	-0.1
T-2	45.8	45.5	0.3
T-1	43.4	42.9	0.5
H-2	44.6	43.8	0.7
K-1	44.1	43.2	0.8
B-1	42.9	42.0	0.9
Q-1	44.1	42.7	1.4
R-2	45.2	43.7	1.5
G-2	45.1	43.7	1.5
S-1	43.5	41.8	1.7
C-2	45.2	43.3	2.0
J-2	45.5	43.2	2.3
S-2	47.0	44.6	2.4
R-1	44.1	41.4	2.7
L-1	44.5	41.3	3.2
G-1	45.9	42.6	3.3
Q-2	47.6	44.2	3.4
B-2	47.0	43.6	3.4
P-1	44.9	41.6	3.4
C-1	46.0	42.2	3.8
J-1	45.2	41.2	4.0
A-1	47.2	42.6	4.6
P-2	48.4	43.5	4.9
D-1	46.7	41.8	5.0
W-1	48.5	43.3	5.2
A-2	50.8	44.5	6.3
W-2	49.8	42.5	7.3

TABLE III:

Approach to target purity. suc=sucrose (true purity), targ=target true purity (= 42.4 - 12.5 log (rs/ash)), dif=true purity - target true purity. All in % total dissolved solids.

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Table 1. Weekly averages of massecuite temperature as compared to final molasses purity points above target.

Massecuite Temperature(°F)	Final Molasses True - Target Purity
120.3	7.97
120.3	7.20
113.6	5.57
112.5	3.93
103.3	3.98
103.3	2.74
102.6	2.71
95.8	1.62
98.4	1.90
94.5	1.10

During 1980-1985 the average purity was approximately 7 points above target. This year the average final molasses true purity was less than 4.0 points. This represents an estimated savings of approximately 1.1 million lbs of sugar.

Conclusion:

For the Louisiana industry overall, the achievement of target purity would increase sugar yield by about 5 lbs of sugar per ton of cane (and increase revenues by about $1 per ton of cane). This potential increase in sugar yield would increase factory revenues by about $5,000,000 (with growers benefiting by $3,000,000 and mills by $2,000,000).

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